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THE SKIPPER FACTOR:
ANALYSIS OF THE COMMANDING OFFICER'S
IMPACT ON SHIPBOARD REENLISTMENT RATES

by

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December 1984

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(continued next page)

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The Skipper Factor: Analysis of the Commanding Officer's Impact on Shipboard Reenlistment Rates

by

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Submitted in partial fulfillment of the
requirements for the degree of

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I. INTRODUCTION

Men mean more than guns in the rating of a ship.
John Paul Jones

The importance of the enlisted man has been a tenet throughout the history of the U.S. Navy. From John Paul Jones to the current CNO, "people programs" have rated top priority and commanding officers have been held responsible to "take care of your men."[1] The degree to which this dictum is heeded varies throughout the fleet from one skipper to the next, but as Rear Admiral Hauley F. Cope, author of Command at Sea, chided, "Woe betide the young captain that fails to appreciate this" [Ref. 1].

The relationship between the commanding officer of a naval vessel and his crew is a special one. Operating in a constantly hostile environment, the crew is heavily dependent upon the abilities and resourcefulness of the individual in command--the skipper. Through the ages, this relationship has been chronicled by numerous authors. Sea captains have been described as everything from benevolent masters to murderous tyrants.

That this relationship merits close scrutiny is obvious when the small ship is considered:

1) The small ship navy constitutes a "society" characterized by crowded living conditions, rigorous working environment, and an emphasis on team work [Ref. 2],

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[1]U.S. Naval Academy midshipmen are required to be familiar with Captain Thomas Truxton's advice to his officers. "Care for your men; see that each understands his duties; exact instant obedience; superintend everything; practice daily with the guns." Captain Truxton, a scholar as well as seaman, was a strict disciplinarian as Commanding Officer of the frigate Constellation at the end of the 18th Century.

and 2) the commanding officer's criticality to the effectiveness of the military organization is magnified by the small confines [Ref. 1]. It is not uncommon for a commanding officer to have daily contact, whether personal or through written directives, with nearly every sailor aboard his ship. Each man on that ship is continually aware of the commanding officer's authority and importance.

Given the amount of influence and authority that a commanding officer has on his ship, he is held accountable by the Navy for the various observable behaviors demonstrated by the ship ranging from combat readiness to crew morale. Perhaps the most visible effect of his influence is the reenlistment rate of crew members.

A. REENLISTMENT

Reenlistment is the process by which an enlisted member of the Military Services signs a contract obligating his services to the military beyond his current obligated service date. First-term reenlistments are normally considered as reenlistments of personnel who are completing their first terms of enlistment. Career reenlistments are for those personnel accepting a second and subsequent reenlistment [Ref. 3].

Reenlistment data are commonly measured as percentages. They are computed by dividing the number of personnel that reenlist in the various categories by the number that are eligible to reenlist in those categories.

B. REENLISTMENT RATE CONCERNS

Although the Military Services have experienced a trend of increasing reenlistment percentages during the past four years, the trend is by no means guaranteed for the future [Ref. 3]. Studies have linked recruiting and retention to

the unemployment conditions in the civilian sector; therefore, an improving national economic climate would have negative effects on the Military Services. If the national economy improves and retention declines, reenlistment rates will again move to the front of the crisis queue for the Military Services, as all parties--Military Services, Department of Defense, President, and Congress--search for a panacea.

The problems caused by low reenlistment rates have been set forth by all levels of the military, government, and academic communities. All agree that low reenlistment rates lead to declines in military readiness. Because of the increasing sophistication of weapons systems that are provided to our armed forces, it is critical that the people operating these systems possess high levels of training and experience in order to maximize weapon system effectiveness. When personnel leave the services after initial tours of duty, they drain the services of the training and experience gained over the period of the enlistment. Newly recruited talent must fill this void, but not without an initial degradation in systems effectiveness. To place this loss-and-refill scenario in proper perspective, it has been estimated that the Navy must recruit a minimum of six personnel to create one First Class Petty Officer with 8.5 years of service [Ref. 4].

Perhaps more visible is the fiscal strain placed on the Defense Department by a transient enlisted force. Not only are weapons systems under-utilized, the price tag to train replacement personnel is enormous. The Navy must spend $13,000 to replace a Boiler Technician Petty Officer Third Class (BT3) with one year of service and $53,000 to replace a BT3 with four years of service [Ref. 5]. Price tags of this magnitude, multiplied by 100,000 Navy accessions per year, contribute to the high training budgets currently required.

More disconcerting is the fact that low retention is a part of a debilitating downward spiral. As retention rates drop, those personnel that remain in the service are required to shoulder an inordinate work load. Longer hours and less experienced leadership lead to ever-deteriorating working conditions resulting in even lower reenlistment rates.

When placed against the backdrop of a decreasing manpower pool available to the Military Services through 1992, the analysis of the retention problem and formulation of solutions becomes even more critical [Ref. 6]. To effectively man the armed forces of the immediate future, a concerted effort must be brought to bear. The individual's reenlistment decision process must be fully studied. The factors which promote increased retention and those which stimulate the exodus must be identified. Not until these factors are identified can administrative and monetary policy adjusted to promote higher reenlistment rates.

C. PURPOSE

This thesis examines some of the links between a commanding officer and his crew through analysis of the degree to which a commanding officer influences the reenlistment rate aboard his ship. The thesis presents a unique approach to the measurement of this relationship.

A turnover model will be presented along with a discussion of reenlistment research concentrating on those variables that were determined to be significant in previous research efforts. A methodology will then be developed that combines these variables and tests the model. Analyses will be performed to compare the proposed model with raw reenlistment percentages. Finally, results will be discussed emphasising the contribution of this approach to an understanding of the reenlisment decision process.

II. BACKGROUND RESEARCH

A. TURNOVER RESEARCH

In their investigation of turnover, researchers have attempted to determine why employees choose voluntarily to leave organizations. Although, the general concepts of job satisfaction, organizational environment, organizational commitment, and other more specific concepts, such as pay and working conditions, have been defined and investigated, the relationships remain speculative. Consequently, the results of studies are often inconclusive, and little is understood concerning the extent to which antecedents actually impinge on an individual's behavior within the organization [Ref. 7]. The discussion offered here will focus upon those factors which were found to be at the heart of the turnover issue. For reasons which will be explained later, these factors will be translated into a shipboard context.

B. ANTECEDENTS OF TURNOVER

A model is offered in Figure 2.1 which depicts the antecedents of turnover. "Significant others" are represented in this schematic because of their presence in turnover research results; yet, the discussion here will emphasize only the critical path.

This model does not diverge significantly from the unified model proposed by Bluedorn in 1982 [Ref. 8]. (See Figure 2.2.) Bluedorn's goal was to develop a unified model to "achieve cumulative progress between" four previous research traditions in the area of turnover research. He succeeded in producing a synthesis of those works. His efforts are expanded here.

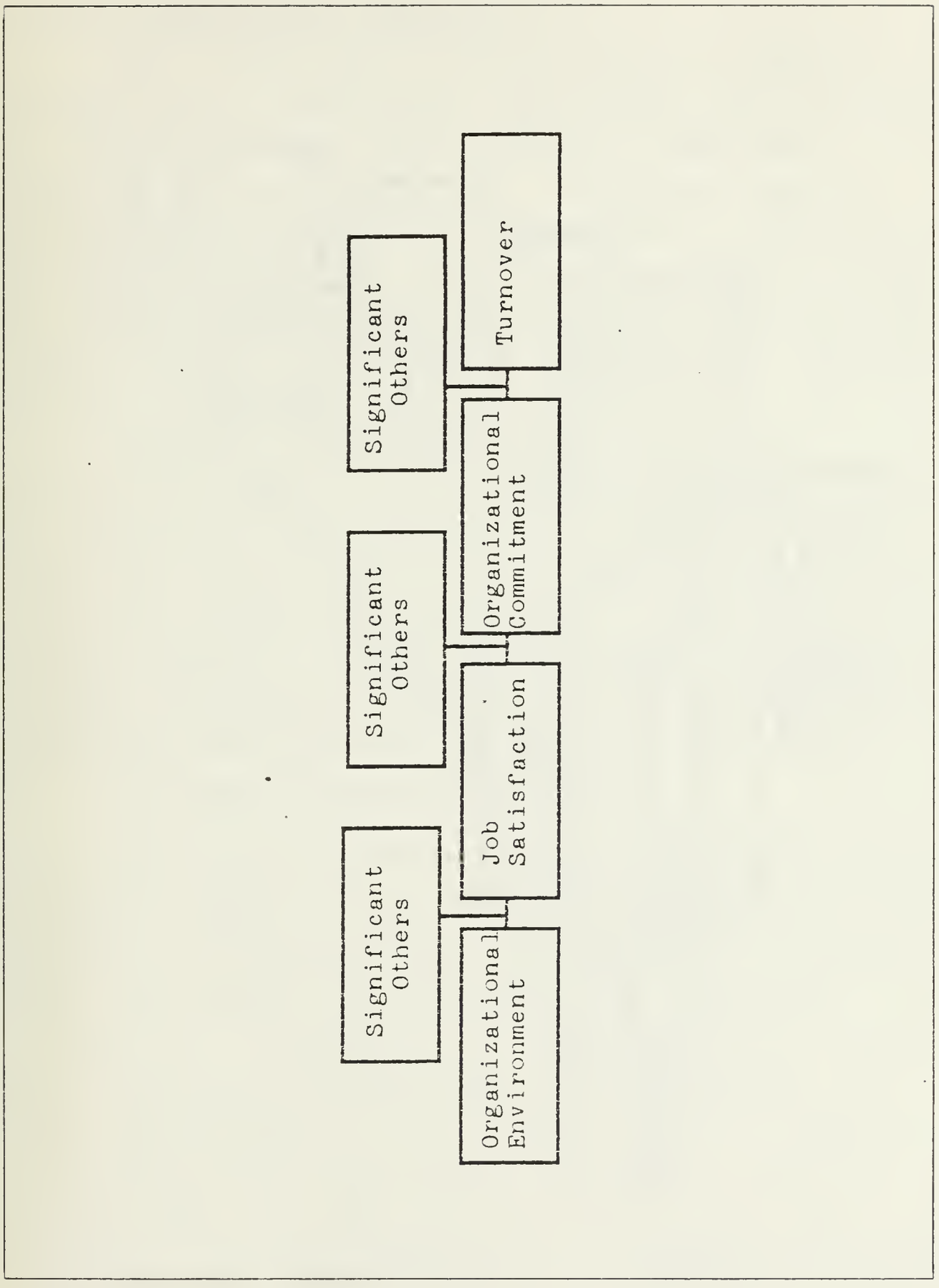

Figure 2.1 Critical Path Model.

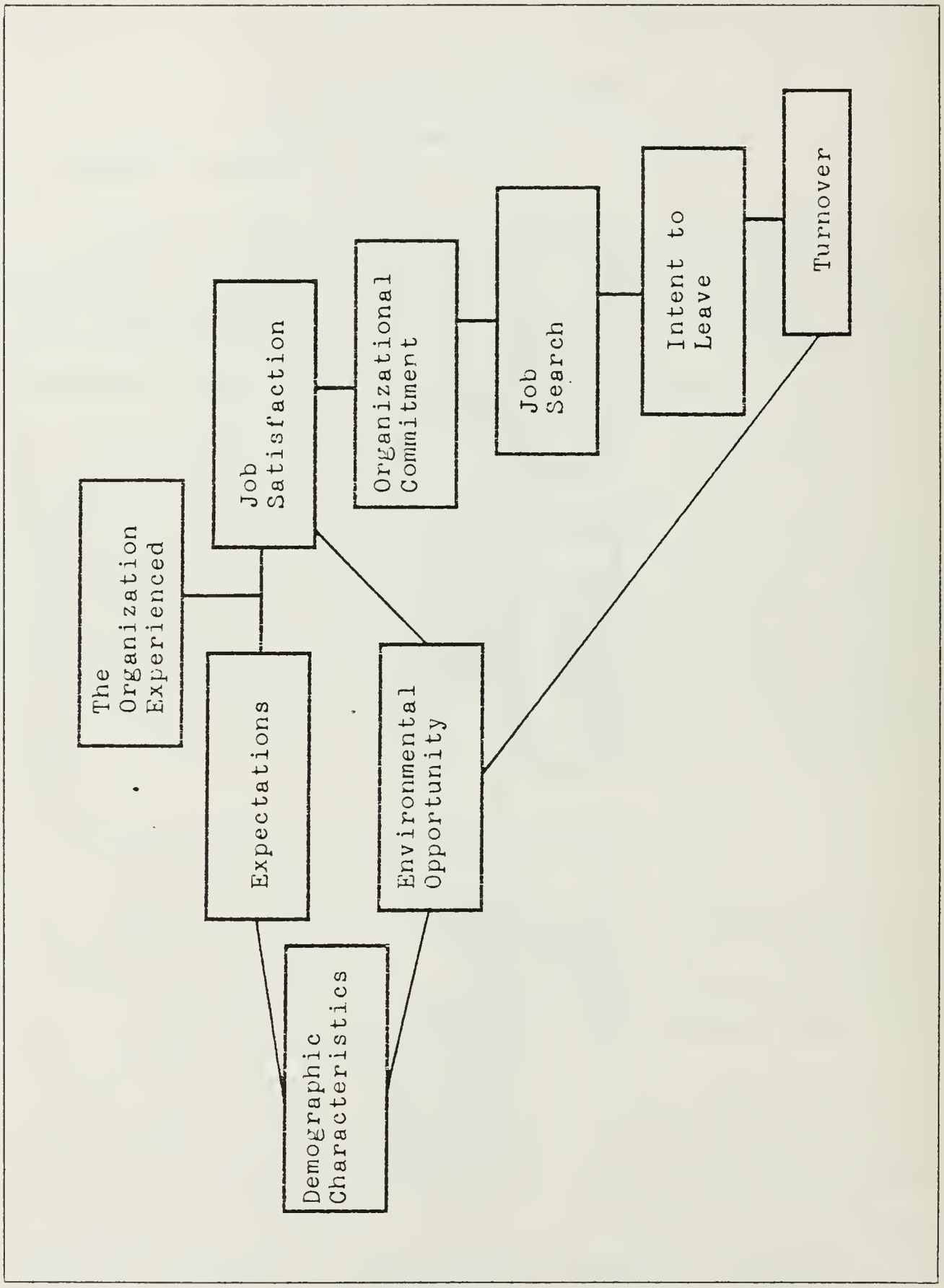

Figure 2.2 Bluedorn Unified Model.

1. Organizational Commitment

The relationship of organizational commitment to turnover is well established. The consensus, best expressed by Porter and Dubin [Ref. 9] is that "commitment to the organization is an attitude that is related to decisions of the individual to stay with an organization." The causes of the commitment-turnover relationship are less well defined, but "may be associated with such positive outcomes for individual employees as enhanced feelings of belonging, security, efficiency, goals and purpose in life, and positive self-image" [Ref. 10].

Other significant contributors to turnover behavior have been examined. Opportunity for alternate employment has been shown by several empirical studies to have an effect on turnover, and by other empirical studies to have little or no effect [Ref. 8] [Ref. 11]. Despite the contradictory findings, organizational commitment is considered the most consistent antecedent--the principal point being "declining commitment leads to turnover." [Ref. 10]

2. Satisfaction With Military Life

The second concept in the critical path model, depicted in Figure 2.1, is job satisfaction which has been defined as the sum total of an individual's met or unmet expectations on the job [Ref. 12]. However, in this model, where reenlistment is the behavior being considered, "job satisfaction" is expanded to "satisfaction with military life," defined as the sum total of an individual's met or unmet expectations of the entire service experience. Justification for this expansion lies in the assertion by Steers [Ref. 13] that the influences on commitment are grouped into the categories of personal, job, and organizational characteristics. Therefore, these

characteristics are better represented by the global term "satisfaction with military life," particularly when studying an institution such as the military.

3. Organizational Environment

The third link in the model, the antecedents of satisfaction with military life, like the commitment antecedents, are modified by personal, job, and organizational characteristics. The primary difference between the two, satisfaction with military life and organizational commitment, is that satisfaction is less stable than commitment over time [Ref. 13]. Therefore, satisfaction with military life is influenced more by conditions that are close at hand and part of daily life such as those influences provided by the immediate organizational environment.

The most immediate environment includes the employees' perceptions of the organizational environment created by the policies of an organization's leaders and supervisors, whether on a local unit level or on an organization-wide level. These policies, from personal grooming standards to fiscal expenditures to living conditions, influence every aspect of the work and organizational environment. Schneider [Ref. 14] addressed this man-organization relationship when he noted that people behave and react in ways that fit their conceptions of the prevailing climate they perceive. Organizations, by their policies, structure, resources, and managerial personnel, can influence employees' attitudes.

Empirical evidence of the relationship between organizational environment and satisfaction with military life was provided by preliminary thesis research by this author utilizing the 1978 DOD Survey of Officers and Enlisted Personnel [Ref. 15] conducted by The Rand

Corporation.[2] Using a sample of first term Navy enlisted personnel serving aboard ship, the primary significant contributors to satisfaction with military life were found to be:

1. perception of unit morale,
2. satisfaction with current duty station, and
3. the respondent's opinion of the command's vital equipment capabilities.

These findings indicate, in the man-organization system, perceptions of satisfaction with military life are determined by factors present in the immediate environment rather than by factors attributed to the more removed organization. That is, morale and conditions aboard ship have a greater impact in the individual's perceptions than do pay and personnel policies of the Naval organization.

4. Commanding Officer as Antecedent

The final antecedent in the critical path model, and the central theme of this thesis, is the commanding officer of the ship. His impact on the organizational environment was recently developed by the research efforts of Gullickson and Chenette [Ref. 16]. After a considerable number of interviews with shipboard personnel, from squadron commanders to deck seamen, they concluded that the excellence observed on the ships that were studied was the "result of the leadership of the commanding officers of these ships." Their interviews invariably arrived at the conclusion that the skipper of the ship set the tone for the entire command. His professional knowledge, and leadership

[2]This survey was commissioned by the Department of Defense to provide a data base to be used in addressing manpower problems. It included four versions and was administered to approximately 93,000 men and women in all four Military Services.

was the catalyst. The skipper, more than any other factor, determined the organizational environment.

C. EMPLOYEE-ORGANIZATIONAL ENVIRONMENT (EOE)

Considering the potential for countless interrelationships among the organizational environment, satisfaction, and commitment concepts, it is not inconsistent with the critical path model to consider these three as components of an all-inclusive concept, to be referred to as the Employee-Organization Environment (EOE). In this way, regardless of individual, job, or organization specific characteristics, the three antecedents of turnover (organizational commitment, satisfaction with military life, organizational environment) may be treated as a system. This permits investigation of the effects of the commanding officer on the system without having to account for the myriad of potential interrelationships within the system. The abridged model looks like Figure 2.3.

D. REENLISTMENT RESEARCH

Although much research has been devoted to studying turnover in civilian organizations, the literature prepared for the military provides more insight into the reenlistment problem. The military environment presents ambient influences which can significantly alter a person's perceptions. As a result, many of the factors that must be considered when studying reenlistment behavior are unique to that environment. Factors which are of significance for reenlistment are not necessariy the most important factors considered in studies of civilian turnover. To explicate this point, it must be emphasized that the military is an institution rather than an organization. A vivid example is that a civilian "works for General Motors, but a career sailor is

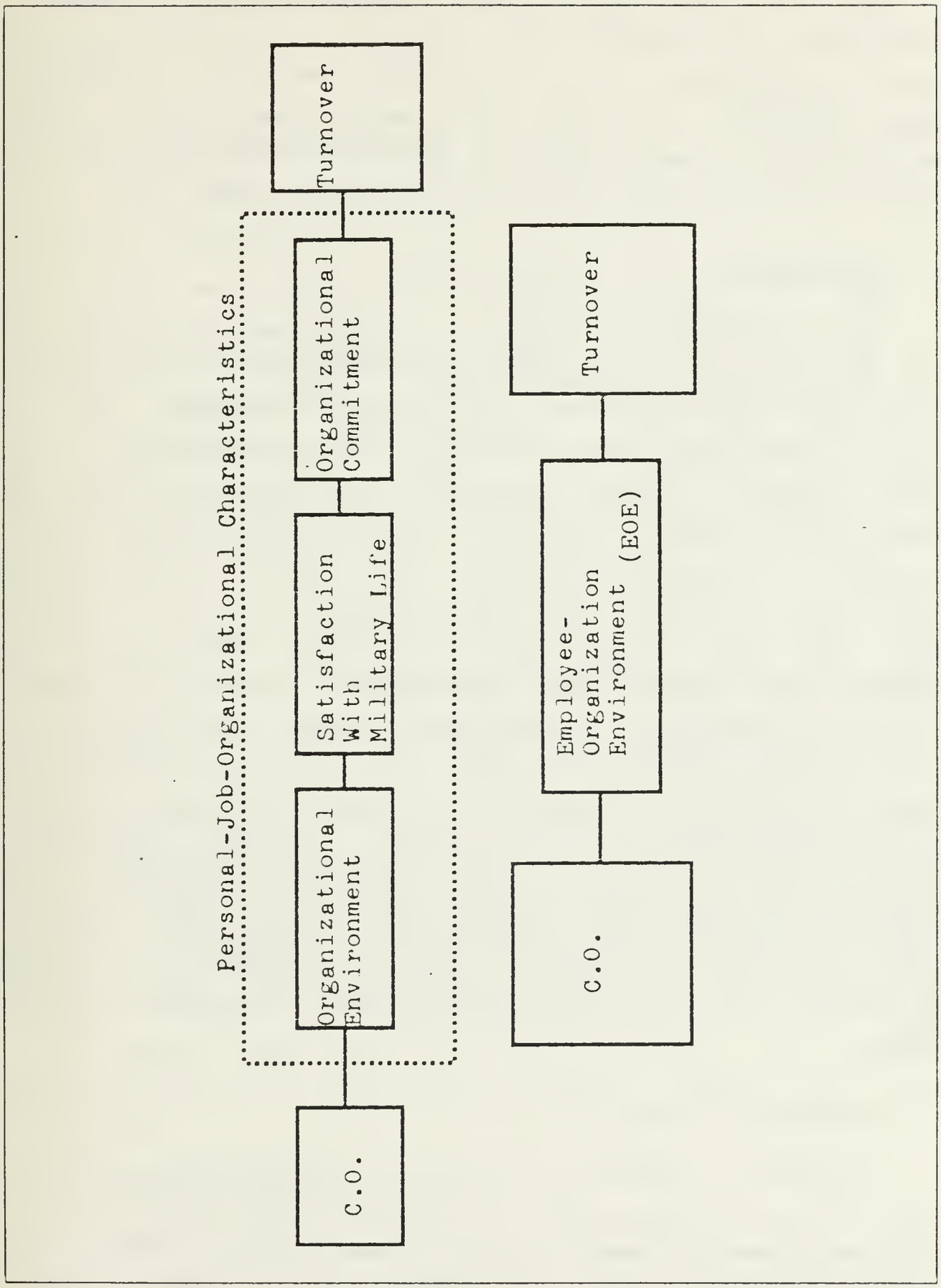

Figure 2.3 Consolidated Turnover Model.

in the Navy" [Ref. 17]. Many concepts such as personal sacrifice, considered a way of life in the military, are viewed differently by the civilian community. Finally, these influences are most pervasive in the life of a Navy enlisted man at sea because of the requirements of life and work in a unique and restricted environment [Ref. 18].

E. CATEGORIES

Although retention research is a complex discipline, it may be regarded as having two main categories: 1) research exploring the effects of econometric variables, and 2) research exploring organization and personal variables. The first category supplies answers to the question, How and where should money be injected into the compensation system in order to increase retention? This research benefits high level policy makers. The second category attempts to identify the right organization- personnel chemistry, and explores the organizational environment's effect on an individual's perceptions and attitudes without specific attention to compensation [Ref. 19]. Its research findings are more applicable to the operational level, the level at which the man-organization interface exists. Although researchers may set out to examine the two categories separately, the interrelationships of pecuniary and nonpecuniary factors often cause them to conclude that the effects of one group of factors are not distinguishable from the effects of the other.

F. ECONOMETRIC ANALYSIS

Econometric analysis has proven to be the more quantifiable of the two categories. Research in this area has dealt with positive and negative effects on retention attributed to adjustments in military compensation, special pays,

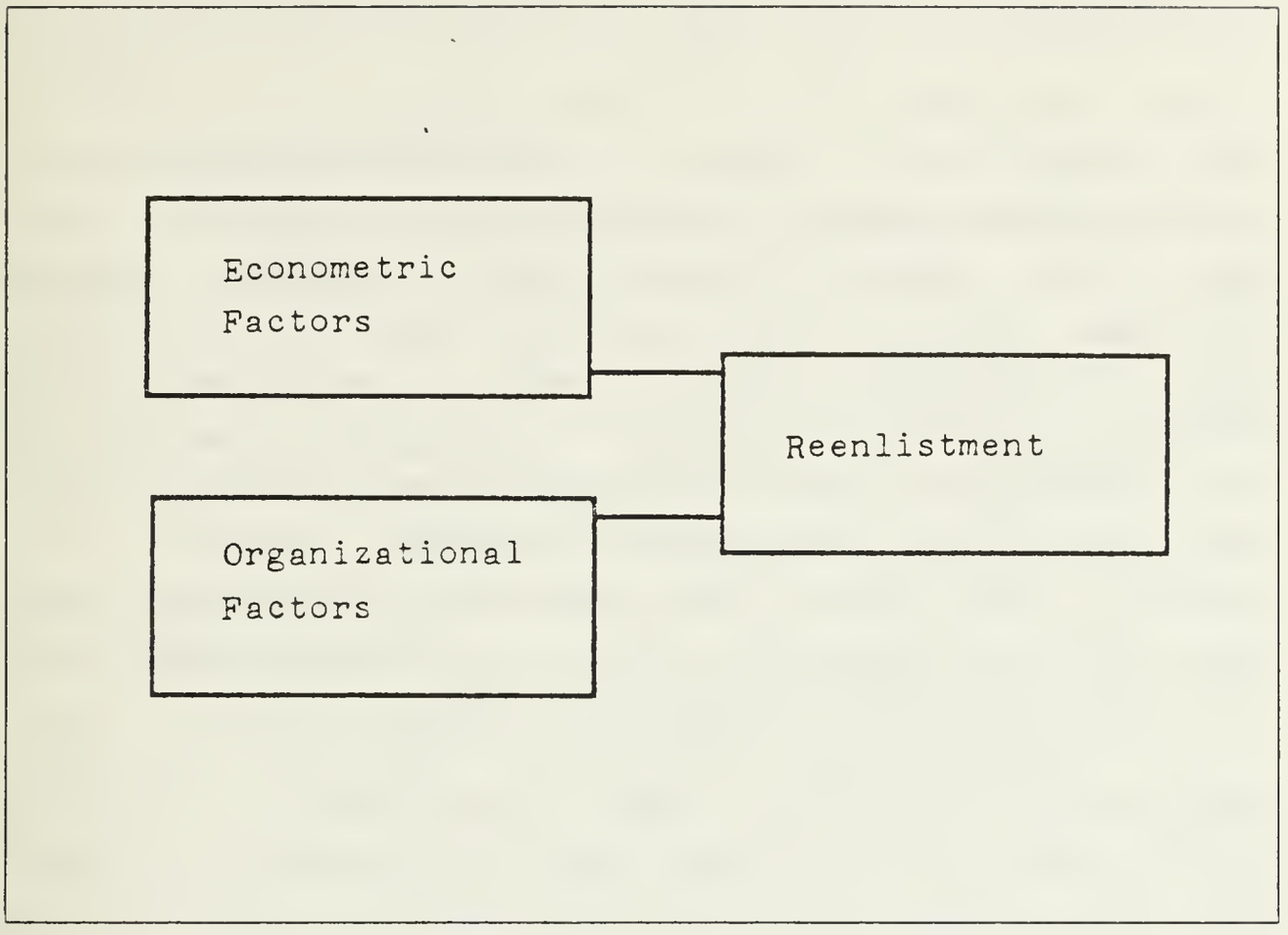

Figure 2.4 Initial Reenlistment Behavior Model.

fringe benefits, and other allowances. This research was slow to gain acceptance from military and government officials because they contended that serving in the military is a duty, and economic principles of supply and demand do not apply. The advent of the All-Volunteer Force in 1972, however, changed the complexion of the problem. After 1972, policy makers began to accept the principle that economic considerations in military career choice are not unpatriotic.

1. Early Studies

The first economic studies were conducted in the 1960's during the Vietnam War when the Military Services

were seeking to attract and retain quality personnel during a period of increasing hostility toward military service. Quigley and Wilburn in 1969 [Ref. 20] studied the reenlistment decision based on behavior as a function of dollar pay, marital status, paygrade, proficiency pay, high school graduate, race, age at decision point, aptitude, years of schooling, average civilian earnings opportunities at decision, and Air Force Specialty Code. Significant positive predictors in the general equation were dollar pay, age, and race. Significant negative predictors were proficiency pay, years of education, and civilian earnings. As much as 83.5 percent of the variance was accounted for by their models using these variables [Ref. 21]. Previous researchers had shown somewhat less significant results.

Several research efforts in the 1970's and 1980's have subsequently used a purely economic approach. Bradley in 1980 [Ref. 4] developed a statistical model to explain past Navy career retention rates and to predict future career retention rates in the Navy. His model utilized econometric variables as predictors. Bradley felt that "modern military man is very much aware of the economic aspects of his employment and bases his decision whether to remain in the service in large measure on those economic factors" [Ref. 4]. He concluded that three variables are significant predictors of careerist reenlistment rates:

1. career Regular Military Compensation (RMC), which is the total value of compensation (ignoring tax advantage and retirement accrual) received by the serviceman,
2. unemployment rate, and
3. The Index of All Services Less Rent, which is taken from the Economic Report of the President, 1980.

Bepko in 1981 [Ref. 22] determined that military compensation, unemployment, and civilian wage opportunities

are significant predictors of career petty officer retention behavior.

2. Negative Findings

Reining in slightly on the econometricians, Hand, Griffeth, and Mobley concluded in their 1977 critical review of retention research that "research results to date indicate that pay is a predictor of the specified criteria (reenlistment intentions). However, the magnitude of the variance accounted for is relatively small." [Ref. 21]

Another limitation of econometric analysis was identified by Gotz and McCall in 1980 [Ref. 23], who pointed out that "most economic theories are designed with the individual in mind, whereas only aggregate data are available." The authors concluded that a life cycle model was required to capture the effects of the future in present decision making, and even when the models were constructed, the available data was inappropriate. Their work with dynamic models included a model for individuals who were making sequential decisions in uncertain environments.

3. Annualized Cost of Leaving

Regardless of the exact impact of pay variables that were studied, the most substantial contribution of econometric analysis to date has been the creation of the Annualized Cost of Leaving (ACOL) model. This model, developed by the Center for Naval Analyses, projects the effects of changes in military compensation on the size and composition of the Navy enlisted force. The model recognizes that the reenlistment rate depends upon the differential between military pay and the civilian pay that enlistees could earn by leaving the military. The model computes the change in this pay differential that results from a change in compensation policy, and transforms it into a change in the

reenlistment rate and the resulting enlisted force profile [Ref. 24].

A corollary to the ACOL model has been the establishment of the elasticity of reenlistment with respect to pay. After examining numerous studies of first-term enlistment, Enns in 1977 [Ref. 25] found that the distrubution of results centered just above 2.0 and that virtually all the estimated elasticities have been between 1.0 and 3.0 per cent increase in reenlistments for each percent increase in pay. [Ref. 26]

G. BEYOND ECONOMICS

The importance of the econometric studies and the impact of economic factors on reenlistment rates goes unchallenged. However, a look beyond economics is required if a better understanding of the individual's reenlistment decision is to be attained. The essence of this argument was poignantly stated by the work of Fletcher and Geisler in 1981 [Ref. 27]. They found that first term reenlistees decisions were significantly affected by pay factors, but career personnel were influenced more by job and quality of life factors.

1. Early Models

Various penetrations into the organization/person labyrinth have been attempted. These range from studies of the effects of single variables to more complex models. In their critical review of literature previously cited, Hand, Griffeth, and Mobley categorized studies under organization practices, climate, job content, attitudes and satisfaction, expectations, demographic and/or biographic, and aptitude scores. After reviewing 67 separate studies in these categories, the authors concluded that none of the variables

showed consistently significant predictive qualities. They stated that reenlistment is clearly multi-variate and that no single category outside of the economic category accounts for a substantial amount of variance. The authors also stated, "the need is to include the broadest possible spectrum of predictors to increase the amount of variance accounted for." [Ref. 21]

2. Recent Models

Since the 1977 effort of Hand, Mobley, and Griffeth, virtually every aspect of the organization role and climate has been studied. These environmental factors, unlike econometric variables which are easily differentiated, are diverse, interrelated, and, subsequently, hard to separate. Therefore, development of a model that can articulate the pure effects of individual variables is an arduous task. In addition, "data are difficult, expensive, and time-consuming to accumulate" [Ref. 3]. Nevertheless, research in this area has produced models which contribute to predictive capabilities.

Using survivor data analysis, Thomason in 1979 [Ref. 28], examined assignment strategies to optimize survival and found that they were in no conflict with those strategies optimizing reenlistment. In regard to reenlistments, he found that the probability of reenlistment varied across ratings. In addition, non-caucasians were more likely to reenlist, those personnel with dependents were more likely to reenlist, and certain types of duty was more conducive to higher reenlistment rates.

Christensen in 1983 [Ref. 29] examined various pecuniary and nonpecuniary influences in the likelihood of reenlisting and found that the respondent's perception of the family being better off as a civilian was the most influential variable. Satisfaction with military life and special pays also showed influence.

Lurie in 1981 [Ref. 30] found that education level, age, and "A" school attendance were significant predictors of survival in the Navy through eight years of service.

A sophisticated approach was provided by Nakada in 1984 [Ref. 31] when he used a discrete version of the proportional hazards model of Cox [Ref. 32]. This is a nonparametric method for estimating a survival curve while controlling for factors that may affect survival. Race, age, mental group, education level, number of dependents, and amount of consecutive sea duty were included as variables. Mental group, education, dependents, and a variable measuring the joint effects of sea duty and dependents showed negative coefficients. The remainder were positive.

Farkas in 1981 [Ref. 33] used survey data to determine how unmet expectations, changes in satisfaction, and changes in commitment relate to changes in the intention to reenlist. He found that unmet expectations determine both satisfaction and commitment, and commitment was more important than satisfaction in determining reenlistment intentions.

Nice in 1981 [Ref. 34] narrowed his field of research to the analysis of Navy family separations. He wanted to determine the psychological effects of duty-related separations on Navy wives, including their effects upon retention intentions. By analysis of survey data, he found the best predictors of a husband's reenlistment intent to be:

1. wife's attitude toward her husband's reenlistment,
2. husband's attitude toward the Navy, and
3. a high level of family stress perceived by the husband.

Farkas and Durning in 1983 [Ref. 35] examined the characteristics and needs of Navy families and found that the best predictors of reenlistment intention were general

satisfaction with life in the Navy, family pressure to leave the Navy, and sex (females expressed less intention to reenlist than males).

H. BALANCED MODELS

As they examined the effects of specific variables on reenlistment intentions or behavior, researchers had little difficulty obtaining significant results. However, the proportion of variance in reenlistment accounted for by the variables chosen for study varied from sample to sample and data base to data base, depending upon the availability of survey or archival data. Researchers in many of the more comprehensive studies of reenlistment behavior sought to balance the influences of pecuniary and nonpecuniary factors by including a wide range of variables in their models.

Chow and Polich in 1980 [Ref. 19] may have developed the most balanced research as they constructed a model of reenlistment that integrated detailed measures of the economic value of military compensation with a broad range of noneconomic factors representing the experiences of enlisted personnel. They explained, "generally, compensation factors are viewed as policy tools that management can manipulate to affect reenlistments, whereas noneconomic variables are viewed as 'limiting factors' that may make a particular subgroup more difficult to retain."

Adams in 1981 [Ref. 5] also researched interrelationships of numerous factors and was able to "reconfirm the fact that perceptions concerning pay/compensation, family separation and job dissatisfaction are strongly related to the decision to leave the Navy."

Sigerrud in 1981 [Ref. 36] concluded that the most important retention intention factors were military pay and civilian opportunities, duty station (sea duty or serving

ashore) and family considerations. He also concluded that the importance of these factors varied across ratings.

As mentioned earlier, Fletcher and Geisler [Ref. 27] used Navy Occupational Task Analysis Program (NOTAP) survey data to examine attitudes toward Navy life. After analyzing evaluations of pay, housing, training, supervision, and other facets of Navy life, these authors concluded that first termers showed that pay and satisfaction with the job are consistently important factors in retention. However, career personnel were found to be more responsive to military life factors. The importance of these factors varied slightly across ratings.

Marcus in 1984 [Ref. 26] found that "there is a significant relationship between advancement and retention," and recommended that advancement be used as an effective and selective retention tool.

The work of Baughman and Darnell in 1982 [Ref. 37] concluded that if organizational commitment is present, pay inequity and job satisfaction do not contribute to career intent. Organizational commitment, tenure, potential upward mobility, sex, opportunity for a more enjoyable job, and age group did contribute to career intent. Their examination of the interrelationships between econometric and organizational variables led these authors to conclude that pay was not a direct contributor to the retention decision.

I. VARIABLE CANDIDATES

The purpose of the foregoing literature review has not been to argue the relative significance of the myriad of variables discussed, but rather to point out the diversity of possible candidate variables for inclusion into reenlistment models.

TABLE 1

Significant Variables in Reenlistment Research

Variable	Effect of Variable
Organizational Practices	Positive
Climate	Positive
Job Content	Positive
Satisfaction	Positive
Expectations	Positive
Race	White-Negative
Education	Mixed
Age	Positive
Paygrade	Positive
Dependents	Positive
Marital Status	Positive
Per Capita income of grouping of states	Negative
Family income	Negative
Performance ratings	Positive
Sea Duty	Negative
Family separation	Negative
Mental Group	Negative
Military Pay	Positive
Reenlistment bonuses	Positive
Civilian Opportunity	Negative
Civilian Unemployment	Positive
Advancement	Positive
Rating	Mixed

Table 1 summarizes the variables which have proven significant from time to time in reenlistment research. The most likely effect of the variable on reenlistment rates is also given.

J. UNEXPLAINED VARIANCE

The proportion of variance in reenlistment intentions/behavior accounted for by individual variables is small, and in many multivariate models with pecuniary and nonpecuniary variables entered, the proportion of variance in the reenlistment decision that is explained by the best combination of independent variables rarely exceeded 35 percent. This means that more than half of the factors accounting for the variance in the reenlistment decision remains at large. A vivid example of this unexplained variance is the fluctuation of reenlistment rates across fleet units. Although all ships operate under the same pay scale and Navy-wide personnel policies, reenlistment rates for any fiscal quarter may vary by over 50 percent from one unit to the next. Figure 2.5 emphasizes this point.

Figure 2.5 contains the average reenlistment rate for a group of fast frigates homeported in San Diego, California from 1977 to 1983. During each quarter, despite the averages, several ships obtained either 0 percent or 100 percent reenlistment. In order for researchers to better understand the reenlistment decision, the objective of research must shift to the reduction of unexplained variance. To accomplish this objective, new approaches must be explored that will incorporate facets of the reenlistment decision that have yet to be examined.

One source of the variance may lie in the infinite possibilities of interrelationships of the variables that are studied by researchers. For instance, the effect of pay on the reenlistment decision varies across mental groups, age groups, family size, family background, ratings, etc. In addition, environmental factors such as sea duty and family separations have unique effects upon quality of life perceptions, as well as joint effects. The permutations are

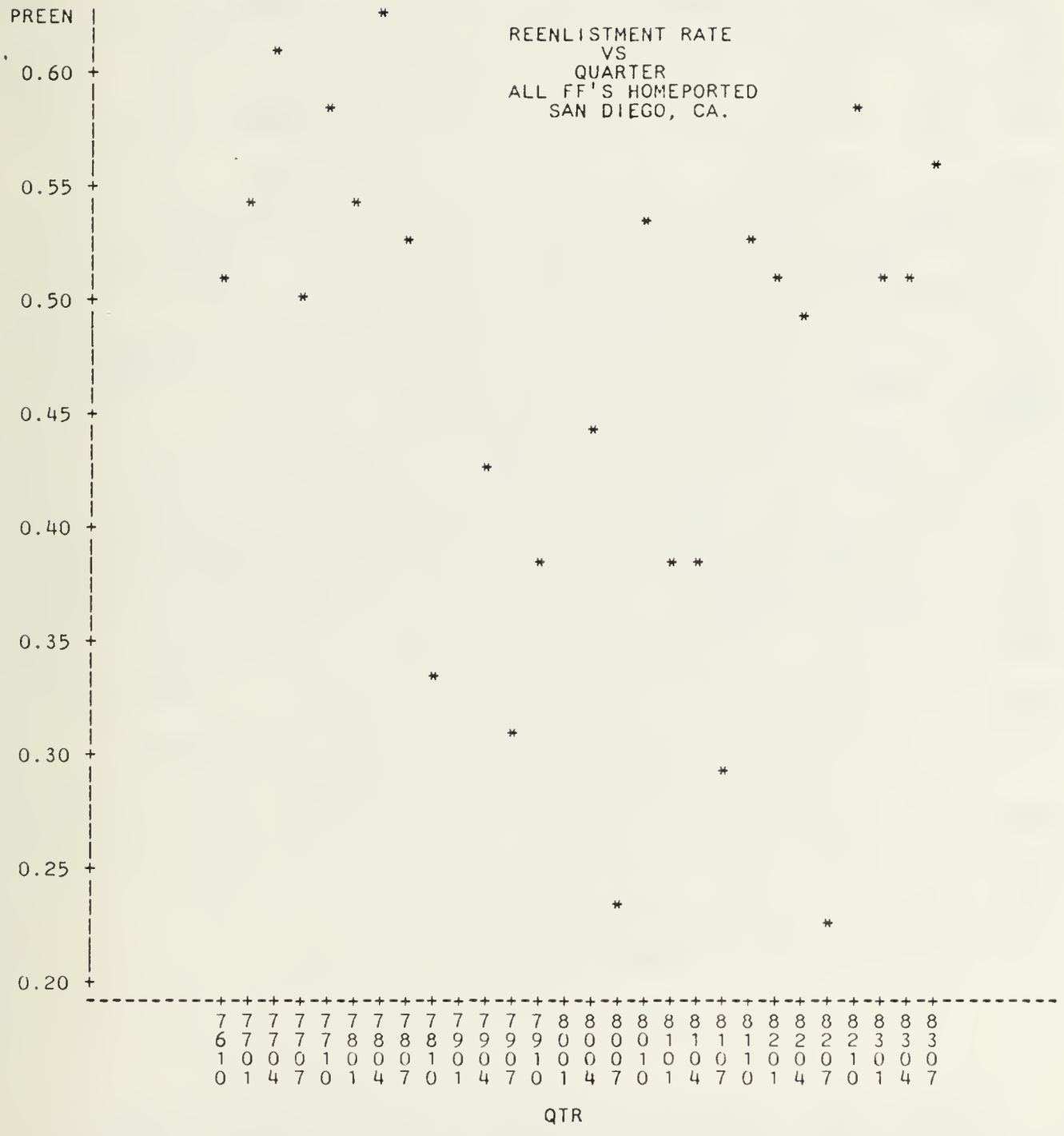

Figure 2.5 Fleet Reenlistment Rates.

endless; therefore, clearly established effects of individual variables are difficult to determine.

A second source of unexplained variance may lie within the area of intangible variables. To date these variables, which encompass such unmeasureable concepts as pride in serving one's country, job security, respect by the civilian community, job satisfaction, observed leadership, team unity, work supervision and others, have been dealt with in Navy-wide surveys with the acknowledgement that their particular effects upon an individual will vary with environmental modifiers and with bio-demographic variables. Consequently, these intangibles, measured separately, rarely display significance for the prediction of reenlistment. Therefore, this thesis poses the following question: Might not the influence of these intangibles vary from command to command depending upon how that command (immediate organization) nurtured and supported those intangibles?

The answer is plausibly, yes, because as Porter and Dubin pointed out [Ref. 9] "the immediate unit in which he/she is located represents a key part of the total organization climate--indeed, for many the 'organization' is the immediate unit." Because of its effect on climate, the immediate command must have a major influence on the individual's perceptions of the organizational environment.

A vivid example of the command influences on the individual is demonstrated by the results of the Enlisted Seperation Questionnaire[3] where six of the top ten dissatisfiers are consistently found to be:

1. too many petty regulations,

---

[3]Since 1980, the Office of the Chief of Naval Operations has requested personnel, officers and enlisted, who are leaving the Navy to fill out this questionnaire. The results are compiled by the Officer and Enlisted Retention Section (OP-136D) and used as input to personnel policies.

2. lack of recognition for doing a good job,
3. not being treated with respect,
4. too much unfair treatment,
5. not enough chance to do more interesting/challenging work, and
6. senior officers don't care about enlisted people.

All six of these factors, it may be argued, are influenced by the immediate command.

K. PROBLEM/HYPOTHESIS

The magnitude of the effect of the immediate command on the individual's reenlistment decision is the central theme of this thesis. It is hypothesized that certain influences inherent in a command act to modify all or some of the previously studied employee-organizational environment (EOE) factors. It is further hypothesized that these command influences are ultimately manifested in reenlistment rates.

Finally, it is hypothesized that although unit reenlistment percentages are the most prevalent measure of a command's retention success, these percentages do not always reflect a command's true retention ability vis-a-vis the fleet norm.

III. METHODOLOGY

A. NEW APPROACH

Encouragement for new concepts and methodologies is found in the remarks of contributing author Barry M. Staw in the 1984 edition of the Annual Review of Psychology [Ref. 38]. Staw states that turnover research "has been fairly narrow conceptually" and that it had not gone beyond commonsense theorizing. An attempt is offered here to break out of the mold of regression research with a new approach.

Given the significant impact of the commanding officer on the organizational environment as detailed earlier, the approach begins with the assumption that changes in the employee-organization environment (EOE) occur shortly after changes of commanding officers. It is further assumed that both the magnitude and the direction of changes in EOE are a function of individual commanding officer leadership and managerial abilities. After each new commanding officer takes command of a ship, his influence on the organizational environment gradually increases as his policies and leadership are imposed. Subsequently, subordinates' perceptions of the organization are influenced by the impact of the commanding officer on the EOE. The result of this chain of events and processes is seen in various observable behaviors such as crew morale, ship combat readiness, and reenlistment rates. Of these, reenlistment rate is the most quantifiable, and will serve as the ultimate criterion for verification of the methodology.

B. QUASI EXPERIMENTAL METHODS

An experimental design was required which would articulate the discrete effect of a change of commanding officer on the EOE. Campbell and Stanley addressed similar circumstances in their development of experimental and quasi-experimental designs for research [Ref. 39]. The classical control group design calls for two randomly selected groups. One group undergoes a treatment over a period of time while the second group does not. At the end of the treatment period, posttest results of both groups are compared with pretest results of both groups. Analysis of the test results is then made in order to determine the affect of the treatment on the one group.

According to Campbell and Stanley, many factors can jeopardize the internal and external validity of this simple experimental design. For instance, the individual characteristics of members of each group could affect the extent to which the treatment was effective. Thus, internal validity is jeopardized by differences across individuals. In a related manner, influences, such as the environment, may affect either the groups, or the effectiveness of the treatment and thus jeopardize external validity.

C. PROPOSED EXPERIMENTAL DESIGN

The design proposed here attempts to control for these jeopardizing factors. In experimental terms, the ship prior to the arrival of a new commanding officer is the treatment group. The reenlistment rate for that ship prior to the arrival is the pretest score. After the new commanding officer takes over and institutes his policies and leadership, the treatment period begins. A treatment is defined as the set of characteristics of a commanding officer which produce changes in the EOE. Thus each commanding officer

represents a different treatment. As his tour onboard progresses, reenlistment rates provide posttest results, with the rates near the end of his tour being the best indicator because of the increased amount of time for the commanding officer to impact the EOE. An analysis of the pretest results compared to the posttest results provides the researcher with an overall view of the impact that each skipper ultimately had on the ship.

D. METHODOLOGY BLUEPRINT

Formulation of the method to fit this experimental design began with a general blueprint. As many variables as possible whose values were available would be incorporated into a model that would discriminate between two levels of a dependent variable--reenlist or not reenlist. This discrimination would be translated into probabilities of reenlisting, given the unique set of values of each individual for the controlling factors, and then compared to actual behavior. These comparisons would then be studied over the tenure of a commanding officer.

E. INTERNAL AND EXTERNAL VALIDITY

Internal validity is protected by the randomized assignment of crew members to the various ships and the use of the logistic function which establishes each individual's probability of reenlistment.

External validity was protected through a method of analysis by cohort. A cohort is defined by the personnel making the reenlistment choice during each fiscal year. This method all but eliminates the external influences of national economic conditions, civilian unemployment, and current prestige of the military because all personnel of each cohort are affected by the same conditions.

Because of the internal and external validity protection, each ship is not only an experimental group, but also serves as its own control.

F. CONTROL VARIABLES

In order to measure the pure effect of the commanding officer on a ship's reenlistment rate, it is first necessary to control for the influences that are not under the control of the commanding officer. Study of the raw reenlistment rates of a command over an extended time period explains this point. (See Figures 3.1 and 3.2.)

Figures 3.1 and 3.2 represent the reenlistment rates for two ships over a seven year period with the periods that the ships were on a deployment[4] superimposed (darkened portion of curve). A loose correlation of reenlistment rates with the deployment cycle is observed. In order to filter out the cyclical nature of the apparent deployment influence from the reenlistment rates, a ship's deployment schedule must be treated as a factor.

Control for other influences on an individual basis is also required due to the wide range of influences on individual reenlistment behavior. For example, personnel with dependents are affected by pay variables in a manner different from that of bachelors.

This control problem was addressed by reviewing the variables studied by previous researchers and categorizing them as either individual, environmental, or organizational. (See Figure 3.3.)

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[4]Deployments consist of approximately six month periods when the ship is out of homeport and assigned to a fleet in an overseas area. Pacific coast ships deploy to the Western Pacific and Indian Ocean.

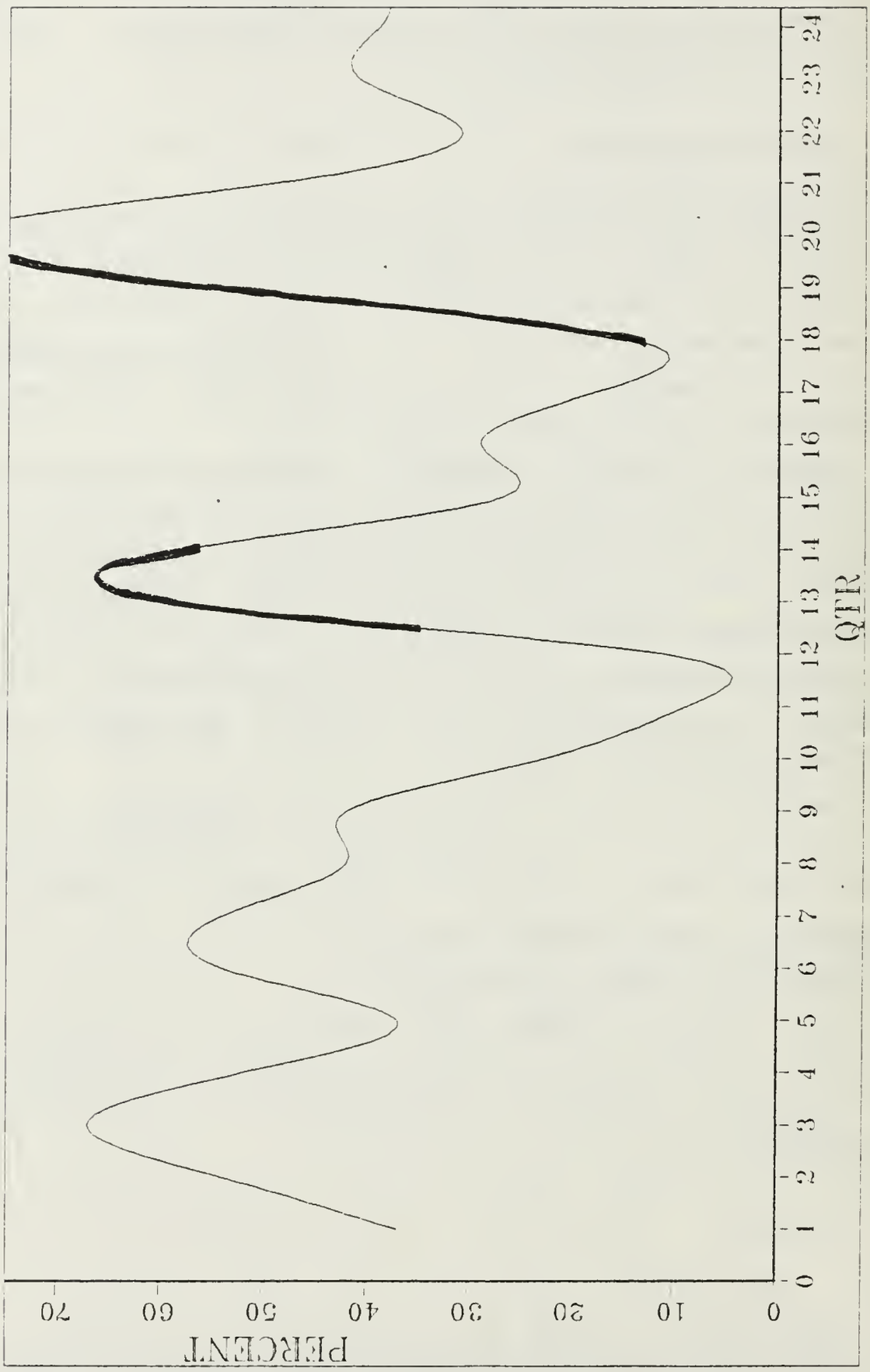

Figure 3.1 Raw Reenlistment Example 1.

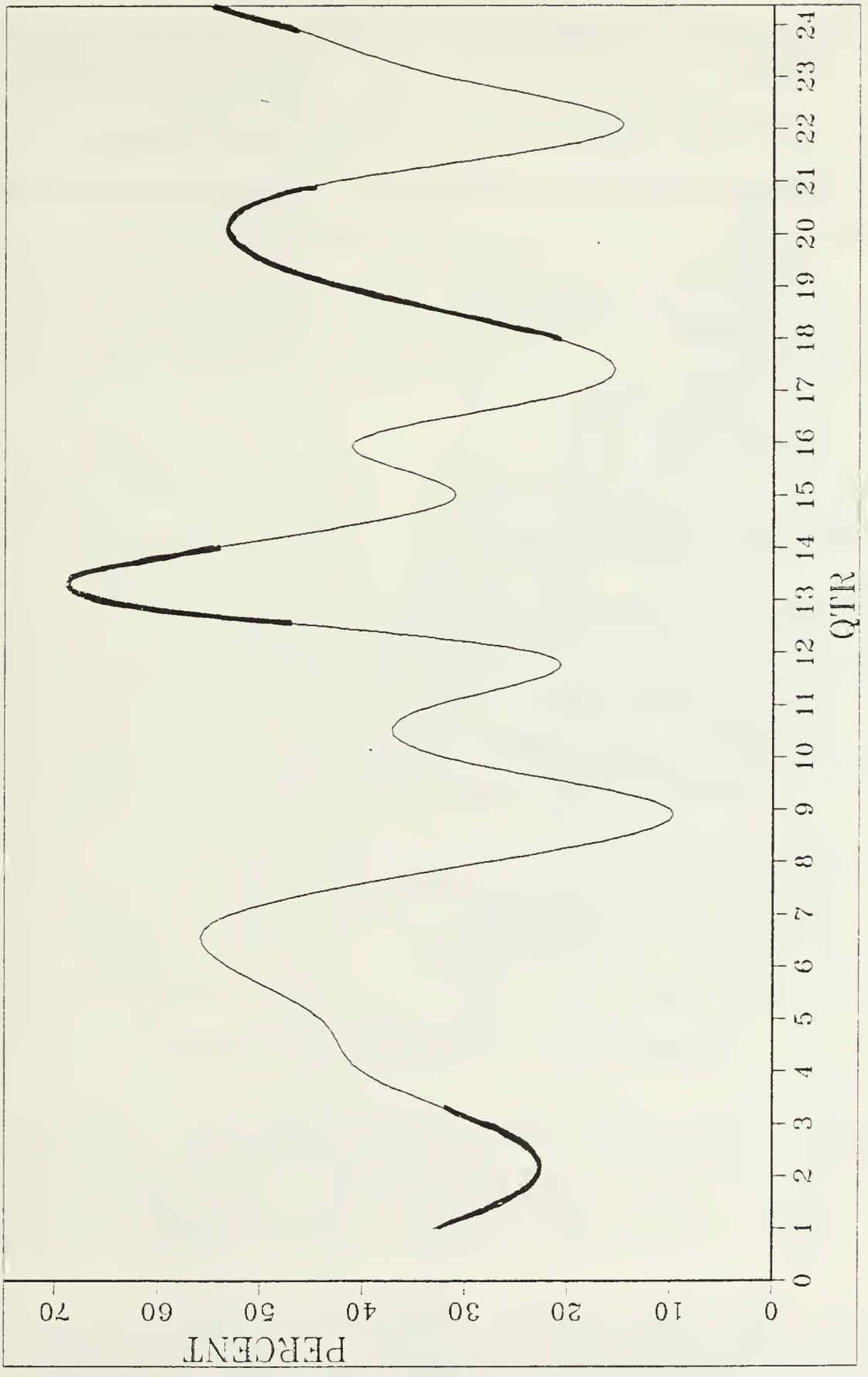

Figure 3.2 Raw Reenlistmet Example 2.

Individual Variables	Environmental Variables
Race	Family separation
Length of service	Civilian unemployment
Armed Forces Qualification Test	Military/Civilian pay ratio
Education	Homeport
Number of dependents	Ship type
Paygrade	Underway time
Rating	
Time since last promotion	
Age at reenlistment	
Selected Reenlistment Bonus (SRB) multiple	

Organizational Variables
Morale
Leadership within command
Retention program
Perceptions about Navy
Job satisfaction
Organizational commitment
Command administration

Figure 3.3 Candidate Variables.

Individual variables were bio-demographical in nature and represented those characteristics of the individual beyond the control of the Navy.[5] Environmental variables

[5]In addition to the researchers noted earlier who utilized bio-demographic variables, Bluedorn also wrote that until the variance in voluntary staying or leaving can be totally explained by more analytical variables, demographic characteristics must be used to predict behavior.

represented those influences on the individual that were beyond the control of both the individual and the individual's command, such as, the ship's underway schedule and national economic conditions.

The final category, organizational variables, comprised those influences inherent in the individual ship commands such as leadership, supervisory policies, and command administration.

Once a set of variables was nominated, the next step was to construct a data set from available files and archives. As the search for a data base began, a choice had to be made between longitudinal and cross-sectional data. It was decided that the best approach would be to use the "snapshot" technique and obtain cross-sectional data on individuals as they faced their reenlistment decision. This approach was justified by research of Porter [Ref. 9] that had found that the most critical period for the turnover decision was just prior to the actual decision. It is also intuitive that an individual's employment decisions are based primarily upon the facts and circumstances at hand, regardless of discount rates.

A search for a data base resulted in obtaining from the Defense Manpower Data Center the "Loss File." This file contains several fields of information on individuals who are "lost" to the Navy as a result of terminating active duty prior to or at the end of their obligated service. Those personnel who immediately reenlist are assigned a special code of "000" in order to distinguish their records from those who left the Navy.

The environmental variables were supplied from the archives of Commander Naval Surface Force Pacific located in San Diego, California.

The organizational variables, the most intangible of the three groups, are considered in the methodology as

hypothetical constructs. The factors represented by these variables would account for the the major portion of the variance in the model, according to hypotheses stated earlier, and are strongly influenced by the commanding officer. The lack of measureable variables which reflect these constructs was paramount to the decision to use this particular methodology.

The primary concern was that the first two groups of variables would provide enough significant variables that probabilities of reenlistment by cohort group could be generated.

G. PERIOD OF STUDY

The period over which the data base was developed is also significant. During the late 1970's, the Navy, as well as the other Military Services, experienced declines in recruiting and reenlistment. The trend was reversed in the early 1980's. Data analysis over this famine-feast cycle might be of benefit to the Navy in order to combat future deteriorating conditions.

H. SHIP TYPE

After careful consideration of the variables in Figure 3.3, it was decided to limit the sample population to the 17 fast frigates currently homeported in San Diego, California. There were several reasons for this decision.

1. Choosing ships of the same type would control for ship type which could range from aircraft carriers with a 7,000 member crew to a hydrofoil craft with a crew of 21. Habitability conditions and other factors differ proportionally across ship type.
2. Choosing ships from the same homeport controlled for the variety of homeports available. Currently U.S.

Naval vessels are homeported in several Atlantic and Pacific coast ports of the U.S., as well as some overseas locations. Some locations are considered more favorable than others.

3. The fast frigate, 438 feet long with a crew of 17 officers and 228 enlisted men [Ref. 40], is a representative destroyer/cruiser type warship with moderate habitability conditions.
4. All 17 of the San Diego based fast frigates were in active service for the period FY77 through FY83; the only years that personnel data were available.

I. PROBABILITY FUNCTION AND COHORT

To establish the probability that an individual would reenlist, the logistic function was used with its range of values from 0 to 1.0 [Ref. 41]. The SAS LOGIST procedure is tailored to this purpose and provides individual probabilities based on analysis of an entire population.[6]

Prior to the computation of individual probabilities, a cohort consisting of each individual who faced the reenlistment decision during each fiscal year (1977-1983) was established. This cohort selection allowed for the control of environmental economic factors which existed at the the time of decision.

J. DELTAS

Once individual probabilities of reenlistment were established, each was then compared to the actual reenlistment decision (value of 1 if the person reenlisted, 0 if he did not), and a delta was generated. (0-Probability produced a negative delta and 1-Probability produced a

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[6]The LOGIST procedure fits the logistic multiple regression model to a single binary (0-1) dependent variable.

positive delta.) Large positive deltas indicate that a commanding officer had reenlisted a person who was unlikely to reenlist based on cohort data; and, conversely, large negative deltas indicate that a commanding officer did not reenlist a likely candidate. Deltas near 0.0 represent the fleet norm.

The means of these individual deltas were then computed for each ship for each fiscal quarter and plotted on a time line. Commanding officer tenures were then mapped upon the time lines.

K. ANTICIPATED TRENDS

Based upon the organizational theory developed and the emphasis placed upon the commanding officer's influence on the EOE and retention, the resulting plots were expected to show a gradual increase or decrease in the means of the deltas as a commanding officer's tour progressed. Such a trend would approximate the gradual impact of a commanding officer on the EOE and the eventual change in reenlistment rates. Commanding officers who had a positive impact on EOE would precipitate increases in the means of deltas and, conversely, commanding officers who had a negative impact would engender decreasing means.

L. REENLISTMENT PERCENTAGE ANALYSIS

After quarterly deltas were generated, they were compared with the difference between unit and fleet (all San Diego FF's) reenlistment averages. If the sign of the delta matched the sign of the unit percentage less the fleet percentage, the quarterly percentage was considered valid. If the signs were opposite, the percentage was declared invalid. Frequencies of invalid percentages were then generated for each unit.

M. ASSUMPTIONS

The primary assumption made during the data analysis was that the subjects who were entered into the data base were on the ships that were studied for on year prior to their reenlistment decision. Basis for this assumption is Navy assignment policy which requires that, unless extreme operational requirements exist, an individual will not be ordered to execute a permanent change of station (PCS) less than one year before Expiration of Active Obligated Service (EAOS). It is acknowledged that these circumstances do exist and some people might report to a new ship just prior to EAOS, however, for the purpose of this data base, those numbers would be insignificant.

It was also assumed that sailors designated "not eligible" for reenlistment were legitimately not eligible for reenlistment.[7] That is, the commanding officer of that vessel did not designate borderline (professional performance) sailors as "not eligible" in order to avoid having a non-reenlisting "eligible" counting against his command's retention statistics.

A third assumption was that the civilian/military pay ratio as well as unemployment conditions amongst civilians remained fairly constant throughout each particular fiscal year.

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[7]Reenlistment eligibility includes several criteria primary of which is that a sailor has shown sustained excellent professional performance and is recommended by the command for reenlistment.

IV. PROCEDURES

The methodology outlined provided only a starting point for data analysis. Characteristic of any new research attempt, the animation of the theory requires periodic adjustments to the preliminary paradigm. This chapter outlines the actual data analysis as it progressed.

A. DATA BASE

The data base was constructed from data located at several sources. (See Appendix A.) The variables which ultimately made up the data base are listed in Table 2. Table 2 defines each variable and gives its source. The variables are of two basic types: 1) raw variables, those which come directly from records, and 2) constructed variables, those which are synthesized from raw values.

The ultimate goal of the data base preparation was to be able to segregate the records of sailors who were eligible to reenlist by fiscal quarter (quarter in which the sailor reenlisted or separated) and by UIC (the ship that the sailor was on at time of reenlistment or separation).

B. DATA ANALYSIS

At the beginning of the data processing, calculated reenlistment percentages were compared with percentages provided by Deputy Chief of Naval Operations (Manpower, Personnel and Training) with favorable results. This supported the validity of the constructed data base.

TABLE 2

Data Base Variables

Variable	Definition	Source
ACDU	Total Active Military Service (months)	DMDC
PRIOCC	DOD Primary Occupation Code	DMDC
ED	Highest Year of Education Completed	DMDC
AFQTPER	Armed Forces Qual. Test Percentile	DMDC
PAYGRADE	Paygrade	DMDC
DOBYR	Date of Birth (Year)	DMDC
DOBMO	Date of Birth (Month)	DMDC
DOBDY	Date of Birth (Day)	DMDC
RACE	Race	DMDC
MARSTAT	Marital Status	DMDC
DEP	Number of Dependents	DMDC
AFQTCAT	AFQT Mental Category	DMDC
RATE	Rating	DMDC
NEC	Naval Enlisted Code	DMDC
SEPCODE	Separation Code	DMDC
DOSYR	Date of Separation (Year)	DMDC
DOSMO	Date of Separation (Month)	DMDC
DOSDY	Date of Separation (Day)	DMDC
BASDYR	Basic Active Service Date (Year)	DMDC
BASDMO	Basic Active Service Date (Month)	DMDC
BASDDY	Basic Active Service Date (Day)	DMDC
CURPYGDYR	Date of Current Paygrade (Year)	DMDC
CURPYGDMO	Date of Current Paygrade (Month)	DMDC
ENLYR	Date of Latest Enlistment (Year)	DMDC
ENLMO	Date of Latest Enlistment (Month)	DMDC
VRBMUL	Variable Reenlistment Bonus Multiplier	DMDC
REC	Reenlistment Eligibility Code	DMDC
PEBDYR	Pay Entry Base Date (Year)	DMDC
PEBDMO	Pay Entry Base Date (Month)	DMDC
PEBDDY	Pay Entry Base Date (Day)	DMDC
UIC	Unit Identification Code	DMDC

Table 2

Data Base Variables (cont'd.)

STMHRS	Hours Steamed by Unit Last Quarter	CNSP
DEPLOY	Months Unit Deployed During Quarter	CNSP
OPPE	Number of OPPE's Held Last Quarter	CNSP
OVHL	Months in Overhaul Last Quarter	CNSP
OVHLOP	Months in Overhaul Out of Homeport	CNSP

Constructed Variables

AGE	Age of Subject at Reenlistment Date (Months)
QUAL	Quality Variable: PAYGRADE/Length of Service
PROMO	Time Since Last Promotion (Months)
QTR	Fiscal Quarter in Which Reenlistment Decision Made
TERM	Career Period Term=1 Less than 72 months service Term=2 Greater than 72 months, less than or equal to 120 months Term=3 Greater than 120 months, less than or equal to 168 months Term=4 Greater than 168 months
CRISIS	Operational Propulsion Plant Examinations (OPPE) During Previous Six Months
YARD	Sum of Shipyard Time over previous 6 months
TOTHRS	Sum of STMHRS Over Previous 12 Months
AWAY	Sum of Deployment Time Over Previous 6 Months
SEPARATE	MARSTAT multiplied by AWAY
STMSEP	MARSTAT multiplied by TOTHRS

PURPOSE OF VARIABLES:

Variable	Purpose
DEPLOY SEPARATE STMHRS STMSEP	Independent variables to represent underway time and family separation.
YARD	Time ship spends in an industrial environment.
PROMO	Control for length of time since last promotion.

Table 2
Data Base Variables (cont'd.)

QUAL	Control for quality: (Paygrade/Years of service)
AGE	Age (months) of subject.
CRISIS	OPPE's; Stressful period for crew.

1. Model Building

After the data base was validated, model building began with the stepwise procedure. The criteria that was used to compare the relative fits of the models were:

1. chi-square,
2. the estimated probability of concordance between predicted probabilities and responses, and
3. the difference in concordance and discordance probabilities.

Variables were fed into the model by fiscal year in accordance with the cohort concept discussed previously. The stepwise procedure determined significance of each variable added to the model. The $p<.05$ level was the cutoff for significance.

After each model was tested, new variables were constructed from combinations of raw variables to attempt to force more variables into the models. In addition, variables which were based on summations over a period were adjusted to lengthen or shorten the period. For example, the AWAY variable, whose value was the number of months the subject was recently deployed, was adjusted from the last quarter up to a summation of the last year. The final period which showed best results was a two quarter period consisting of the two quarters previous to the reenlistment decision.

2. Partitioning

In addition to variable construction, several data partitions were attempted to improve model fit. "By TERM"(reenlistment term) and "by rating" were the most likely. Also, "by Selected Reenlistment Bonus(SRB)" was attempted. All these met with no success. However, a new variable, MARKET, was constructed to differentiate among ratings by SRB, and did show potential. With MARKET, each rating was placed in one of three market categories based upon amount of bonus offered to remain in the Navy. This was an attempt to control for those ratings which had the most attractive skills for civilian employers. After a MARKET value was generated for each of the ratings, models were then attempted for each of the three MARKET groups.

C. BEST MODELS

After all partitioning was completed, it was found that none of the partitioned data bases improved on the original data base composed of all career groups and all ratings. The final logistic models were selected for each fiscal year (FY77-FY83) cohort and then entered into the LOGIST procedure. Individual probabilities of reenlistment for each sailor were then generated.

V. RESULTS

Logistic functions were estimated from cohort sections of the 4245 record data base. The variables in Table 4 were selected as the significant variables for each cohort model. All models were significant at the $p<.001$ level. A tabulation of the significant variables from all the models is provided in Table 3. In the table, each variable is listed with its effect on reenlistment.

TABLE 3

Significant Model Variables

Variable	No. of Models In Which Variable Appeared	Effect on Retention
ACDU	4	Positive
WHITE	4	Negative
DEP	4	Positive
AGE	4	Positive
QUAL	3	Positive
STMSEP	3	Positive
AFQTPER	3	Negative
CRISIS	2	Mixed
PAYGRADE	2	Positive
PROMO	1	Negative
YARD	1	Negative
AWAY	1	Positive

TABLE 4

Final Models

Fiscal Year	Significant Variables	Chi-square	Fraction*	Rank**
1977	ACDU, WHITE, DEP	88.47	.699	.445
1978	AGE, DEP, CRISIS, YARD, WHITE	107.52	.760	.531
1979	ACDU, WHITE, QUAL, STMSEP, AFQTPER	106.87	.766	.548
1980	ACDU, AGE, STMSEP, CRISIS, QUAL, AFQTPER	129.45	.794	.601
1981	ACDU, STMSEP, QUAL, PROMO	259.25	.806	.624
1982	AGE, DEP, WHITE, PAYGRADE	153.37	.752	.518
1983	PAYGRADE, DEP, AGE, AWAY, AFQTPER	191.60	.805	.618

* Fraction of concordant pairs of predicted probabilities and responses.

** Rank correlation between predicted probability and response.

A. TRENDS

When the delta values associated with a given ship were plotted as a function of time, the plots contained in Appendix B resulted. The patterns that occurred during each tenure were categorized by the predominant behavior of the deltas during each tenure. The 62 tenures were placed in the following categories:

1. Deltas remain predominantly in the positive region during the tenure (delta greater than 0.0). (See Figure 5.1.)[8]
2. Deltas remain predominantly in the negative region during the tenure (delta less than 0.0). (See Figure 5.2.)
3. Deltas with definite slopes. Shift from positive to negative and vice versa or initial deltas clearly positive or negative, and shift to a more neutral position (closer to or around the 0.0 baseline). (See Figures 5.3 and 5.4.)
4. Deltas that are unsystematic about the 0.0 baseline. (See Figure 5.5.)

Table 5 tabulates the numbers of patterns that emerged.

B. DELTA/REENLISTMENT PERCENTAGE COMPARISON

After the deltas were compared to reenlistment rates of eligibles, 85 percent of the quarterly reenlistment rates were determined valid. Gross reenlistment rates (eligible and non-eligible personnel) were determined to be valid 82 percent of the time.

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[8]In all the delta plots, the vertical interruptions of the time lines indicate the beginning of the first quarter in which the new commanding officer is completely responsible for retention although he may have actually taken over from his predecessor sometime during the previous quarter.

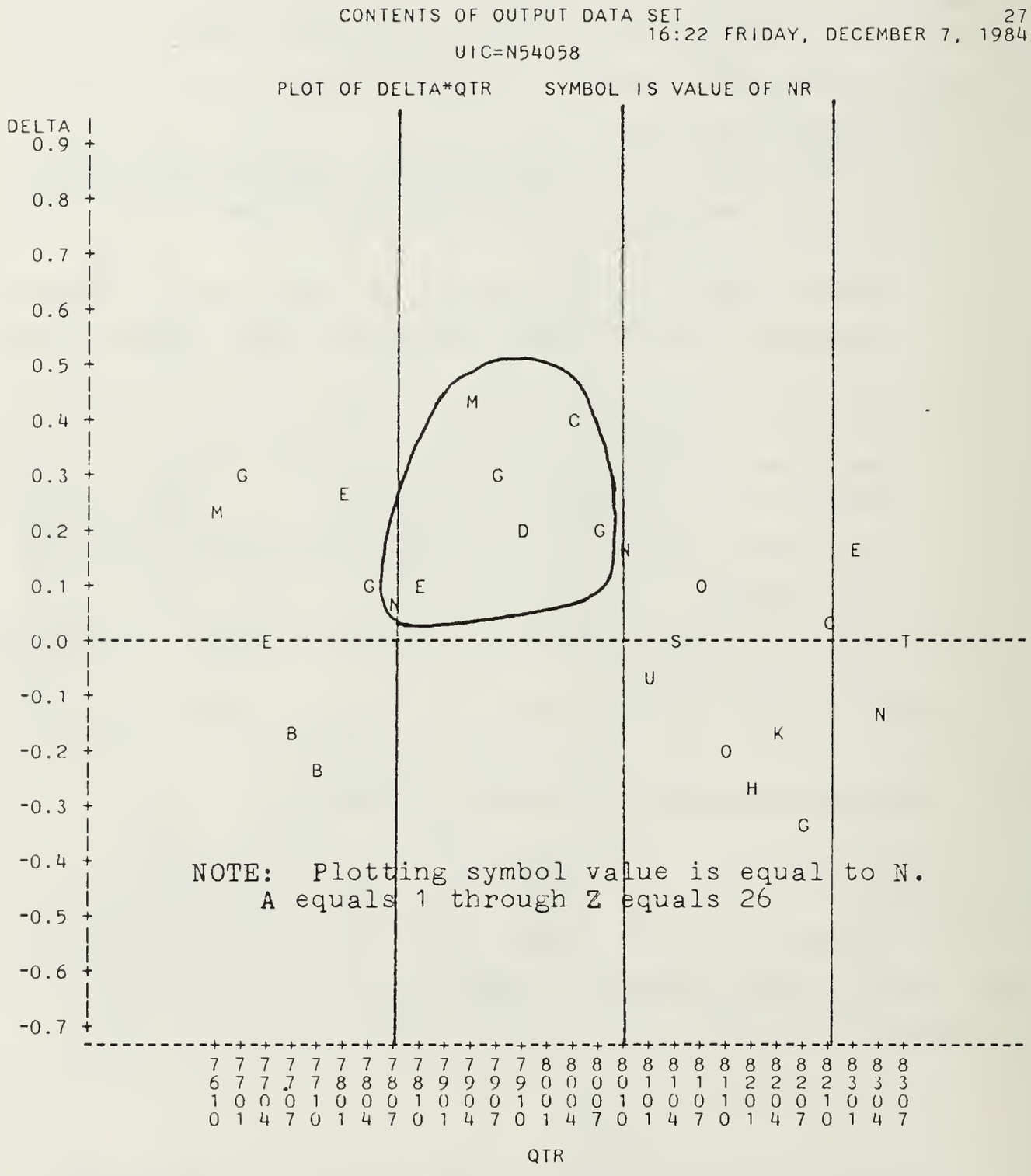


Figure 5.1 Positive Delta Example.

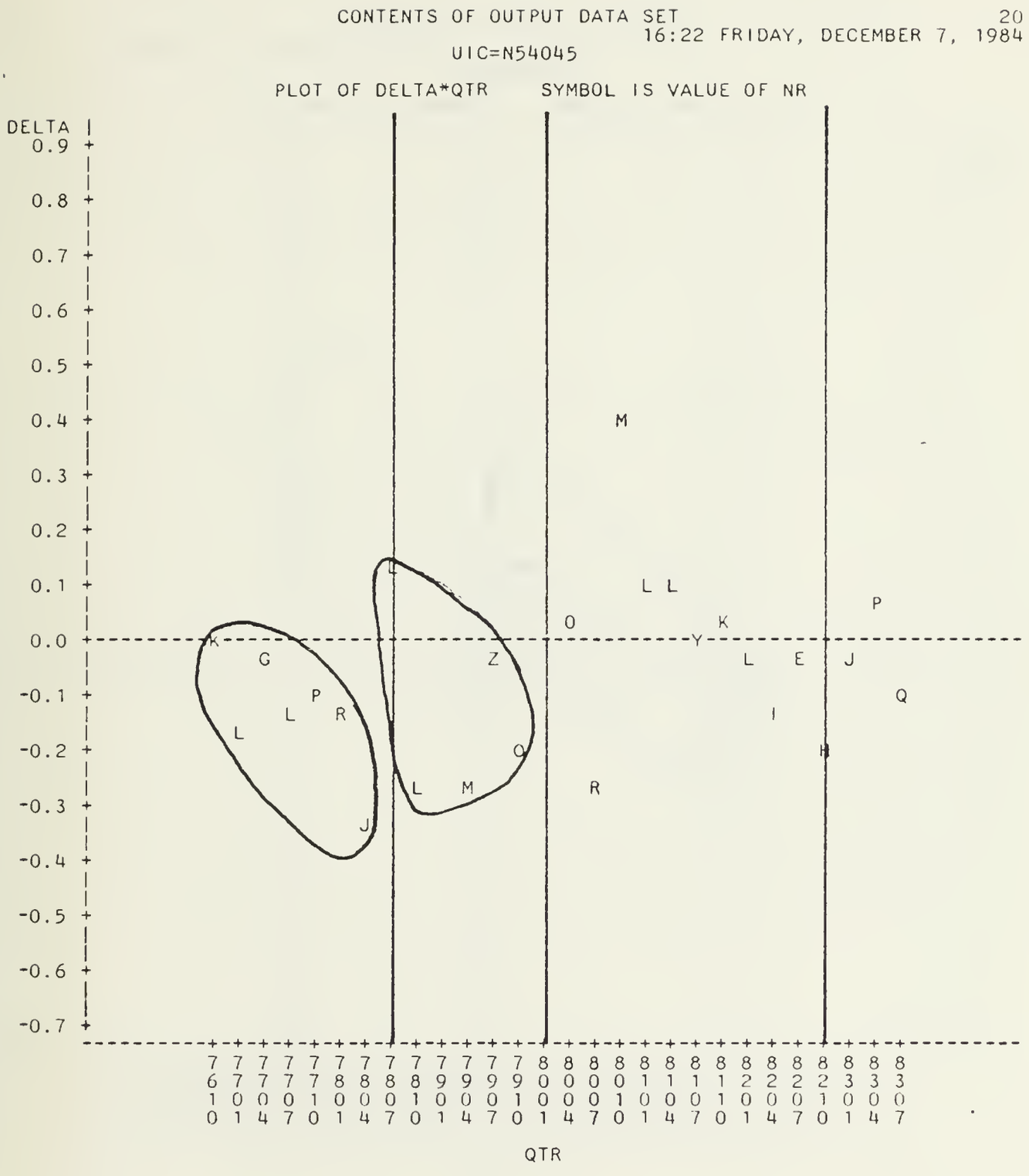


Figure 5.2 Negative Delta Example.

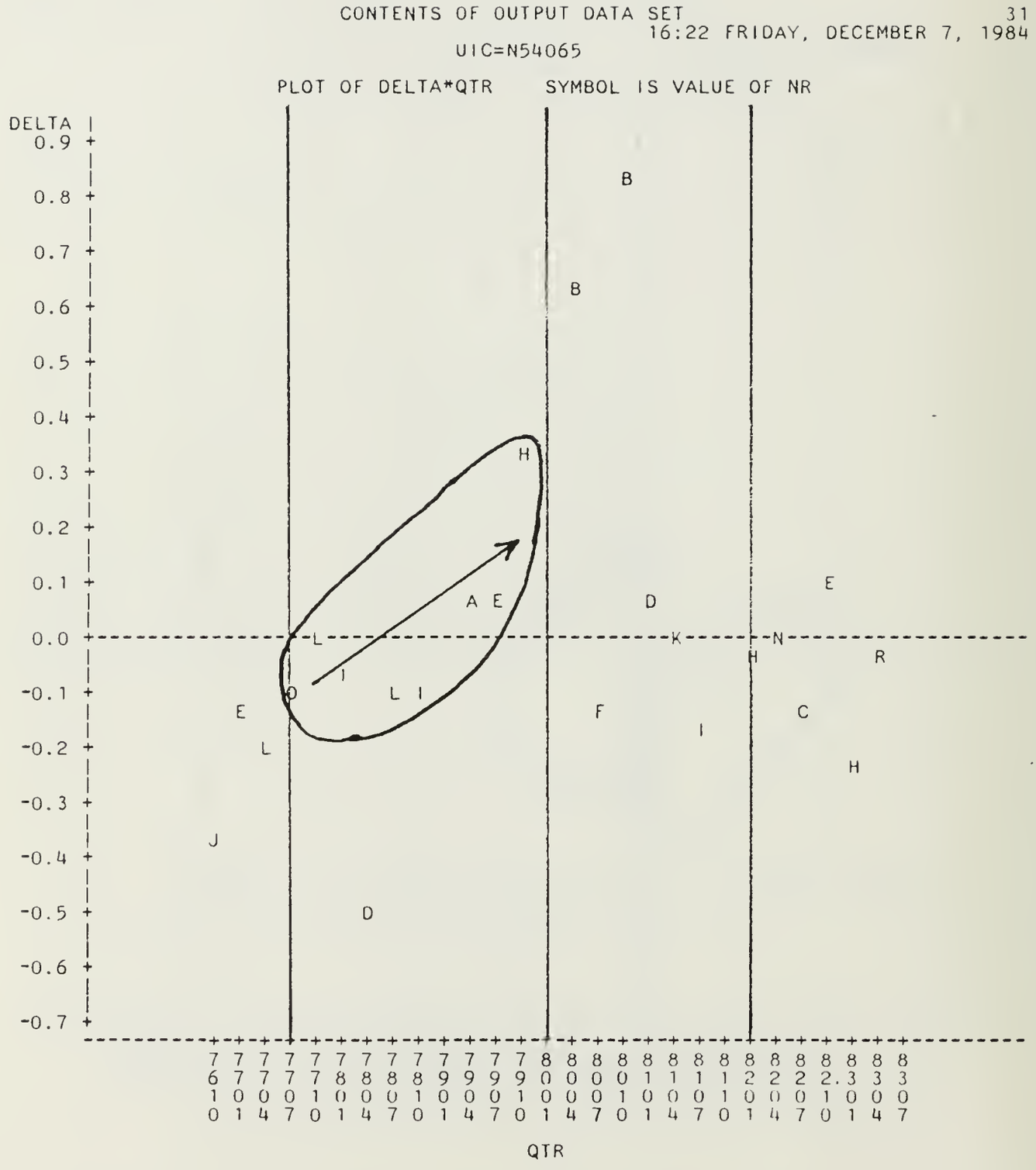


Figure 5.3 Positive Slope Example.

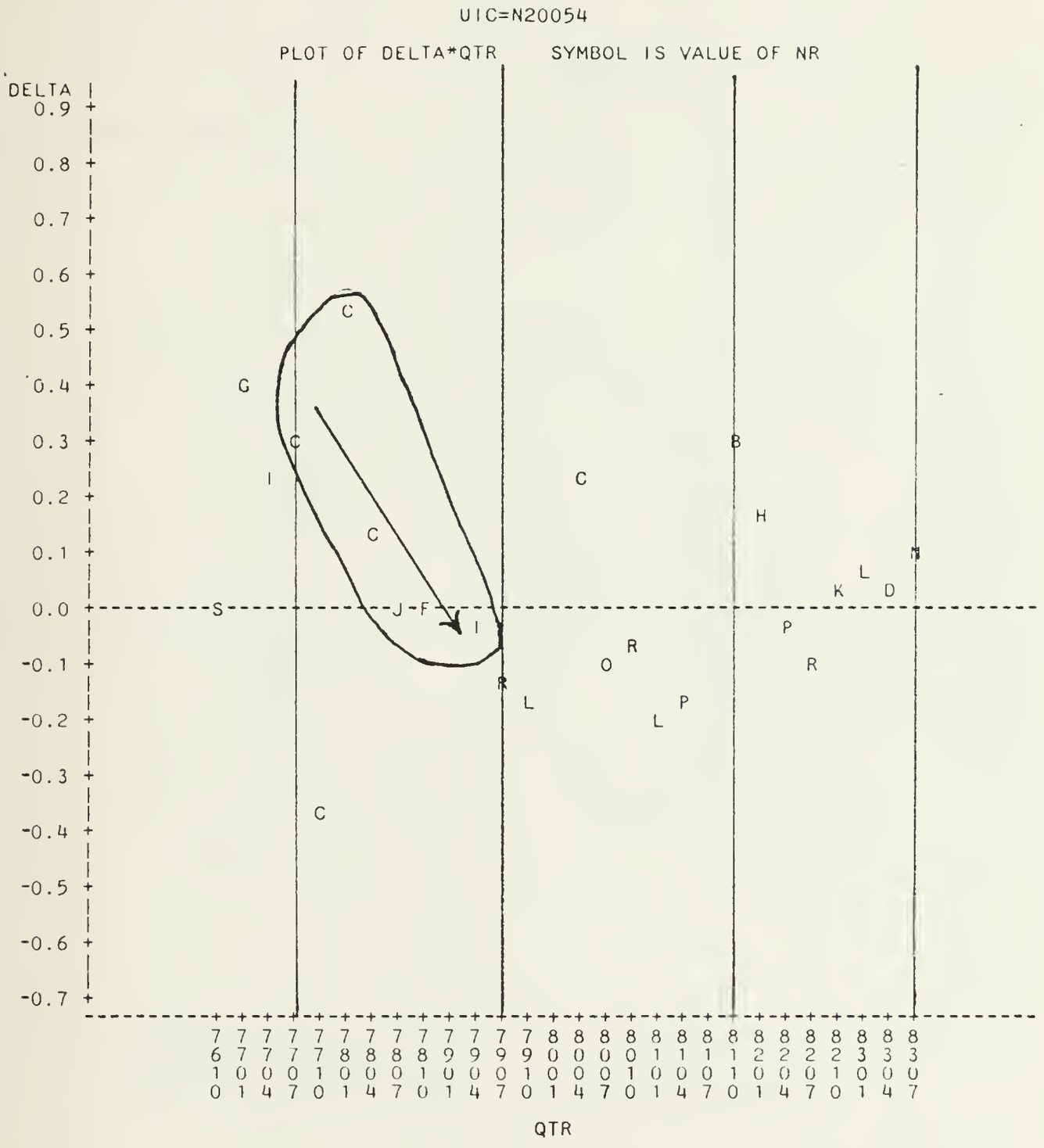


Figure 5.4 Negative Slope Example.

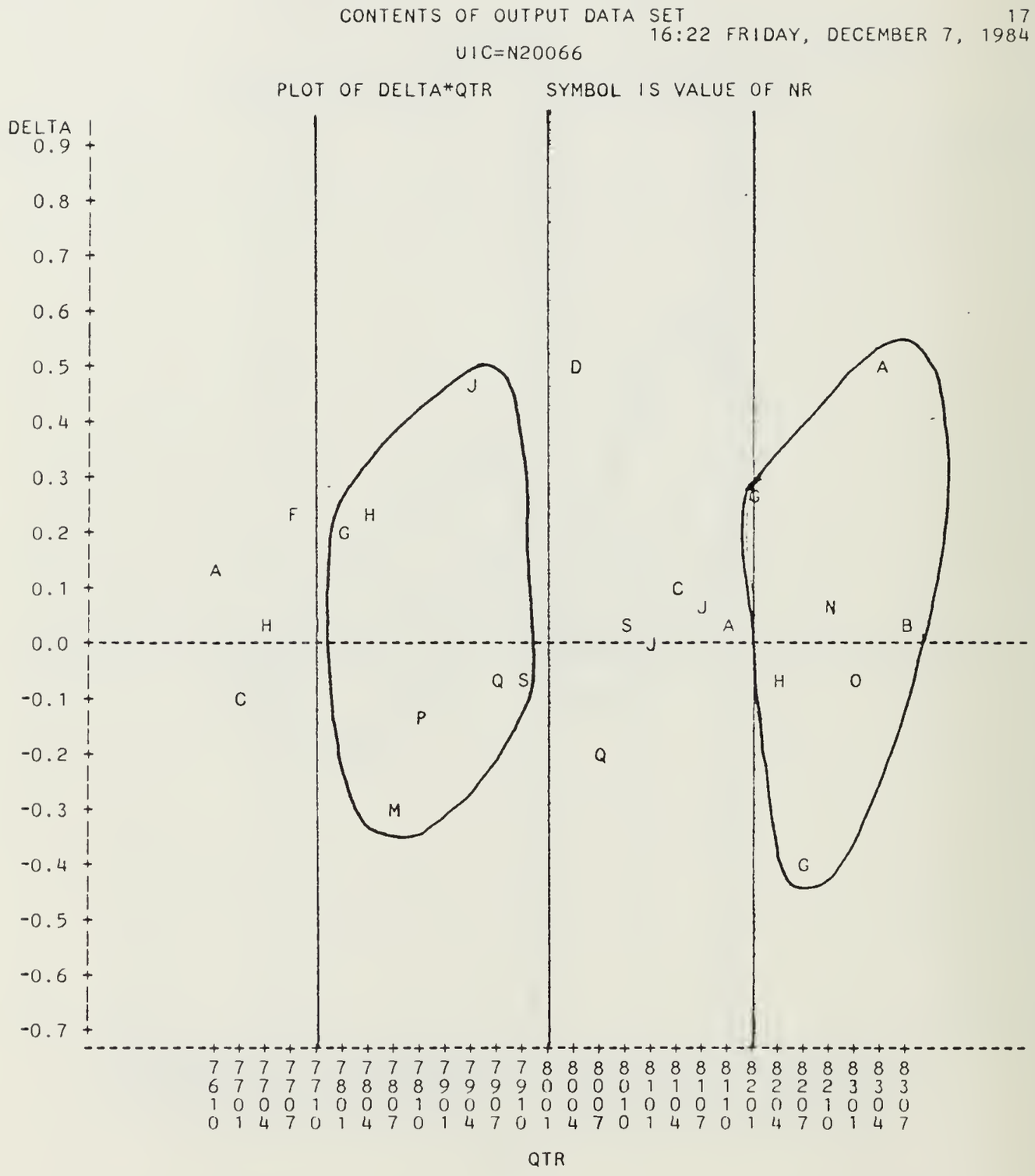


Figure 5.5 Unsystematic Delta Example.

TABLE 5

Tabulation of Delta Patterns

Pattern	Number	Percent
Positive	16	26
Negative	7	11
Slope	7 Negative 6 Positive	21
Unsystematic	26	42

VI. DISCUSSION

A. TREND INTERPRETATION

The delta plots indicate distinct trends which are not as discernable when graphs of raw reenlistment rates (sailors eligible for reenlistment) are studied. (See Appendix C.) The well-defined trends within the delta plots are achieved by the application of the logistic function which acted as a smoothing function on the raw data. Figures 6.1 and 6.2 provide a comparison.

A large proportion (42 percent) of the delta plots bracket the 0.0 baseline indicating that the ship is retaining in accordance with the fleet norm. This proportion of unsystematic patterns is no surprise in light of the competition to become a commanding officer. Each Naval Officer who aspires to command at sea must complete several levels of professional and tactical skills qualifications, as well as, performance record screenings by the time they attain Commander rank (a time frame of approximately 14 years). Of this final qualified group, less than one half are selected to become commanding officers. Such a competitive process assures the Navy of a uniformly high level of professional competence among its skippers.

Although only 13 of the 62 commanding officer tenures showed definite slopes, every pattern offers an opportunity for insights into skipper performance. In addition to the unsystematic plots:

1. A consistently positive delta indicates that the commanding officer is retaining above the fleet norm, i.e., he is retaining some sailors who might have left the service under other personal conditions or command environments.

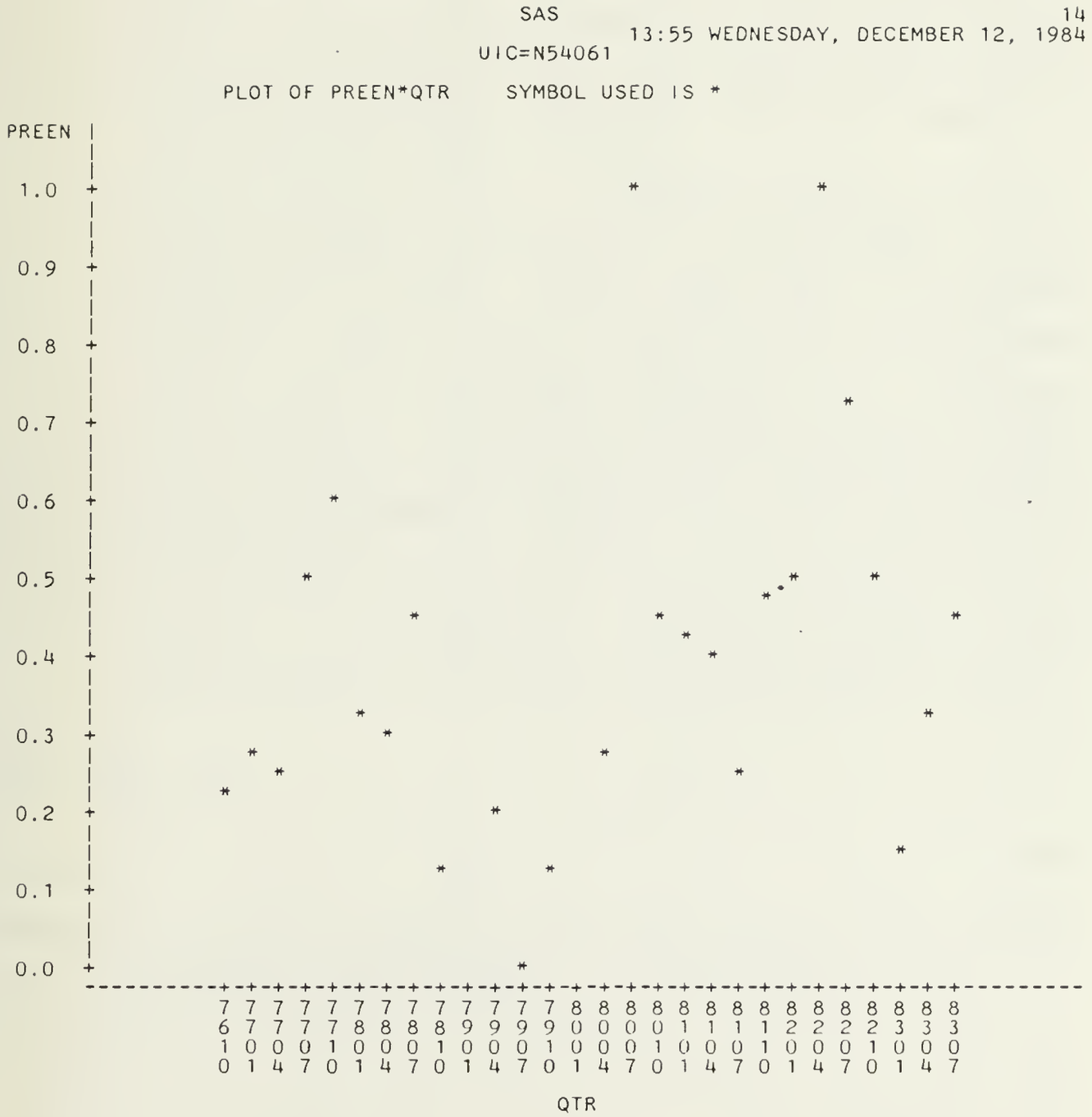


Figure 6.1 Comparison Example: Single Ship Reenlistment Rates.

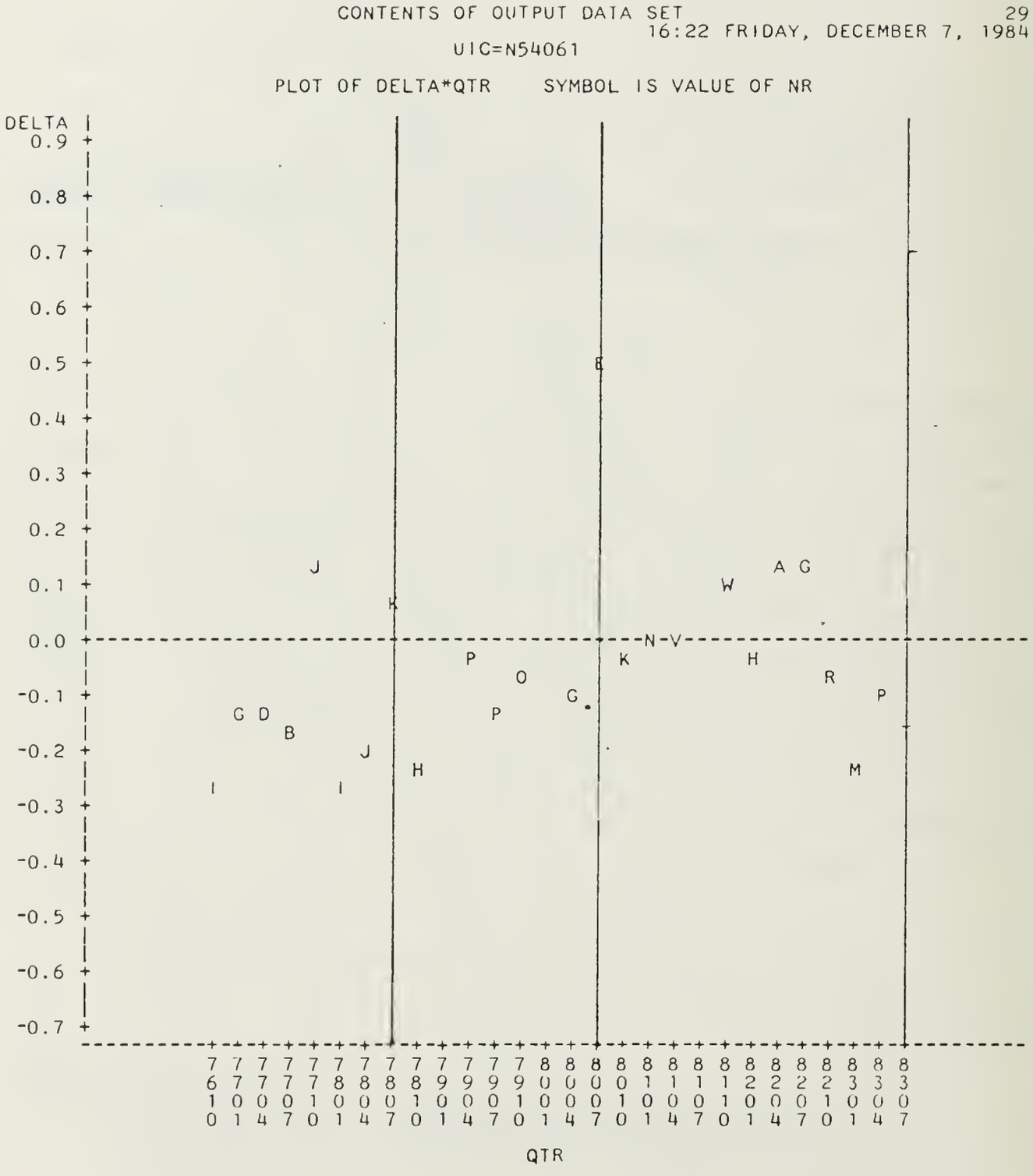


Figure 6.2 Comparison Example:
Single Ship Delta Plot.

2. A consistently negative delta plot indicates that the commanding officer is retaining below the fleet average, i.e., not retaining some sailors who would have reenlisted under other personal conditions or command environments.
3. A shift from negative to positive indicates an improving command environment. These effects would result if, upon inheriting a command which had been experiencing difficulties in leadership, a new commanding officer turns the situation around by improving the command climate.
4. A shift from positive to negative indicates a deteriorating command environment. In this case, a new commanding officer might take over a thriving command, only to cause deterioration in the command climate and a subsequent reduction in retention. (These reversal trends are, perhaps, the most significant because they imply the new commanding officer caused a dramatic change in the organizational environment.)
5. A shift from above average (or below average) command climate to the baseline represents retention rates which regress (or progress) toward the fleet norm.

B. SHIFT LAG

Support for the theory that these delta shifts are caused by changes in commanding officers is given by the relative frequency with which the trend shifts are preceded by a commanding officer change. These shifts normally lag the change in commanding officer by one to two quarters. This observed lag supports the commanding officer-EOE link because of the time period required for the commanding officer's policies and leadership to impact the organizational

environment, as well as the time required for individuals to perceive a change of environment. In addition, a negative trend normally displayed a greater slope than a positive trend. This suggests that it takes longer to turn a poor organizational environment around than it does to permit a good environment to deteriorate.

C. TREND ABSENCE

Perhaps even more significant than the trends so far discussed, is the absence of one particular trend. These would be plots displaying positive deltas during the bulk of a commanding officer's tenure, but negative or less positive near the end of his tour, indicating that the commanding officer is becoming less effective as a retainer towards the end of his tour. This phenomenon runs counter to popular conceptions of normative management behavior. Had there been even a small number of trends of this form it would suggest that all observed trends might be no more than random effects, not necessarily associated with commanding officer changes.

The opposite effect is also possible. One can find instances among the delta plots of negative results at the beginning of a tour and either positive or more neutral results at the end. Such effects may describe commanding officers who start their tour as poor retainers, but improve throughout their tenure.

D. DELTA PLOT RESTRICTIONS

Additional analysis of the delta plots is somewhat restricted. It may seem desireable to calculate slopes of the plots, then equate them to successful and unsuccessful retainers, but this would result in misleading conclusions in those instances in which a good retainer steps into an

already positive situation. His success would result in a zero slope as the deltas remained positive.

Along the same line of reasoning, averages of deltas would not accurately reflect command climates. A commanding officer may take over a negative situation and lead it to the baseline. In this instance, although a good retainer who is demonstrating improvement from an initial low point, this commanding officer's overall average delta would be negative, yielding an incorrect indication of his retention ability.

E. COUNTER ARGUMENTS

An argument could be made that more is being read into the delta plots than is actually there. It is often said that "beauty is in the eye of the beholder," and it is always dangerous to base firm conclusions upon subjectively validated hypotheses. However, considering the 17 delta plots in total, the trends appear to be more than coincidental; and, as stated at the outset, an attempt was made in this study to depart from standard methods of analysis. A paradigm has been provided for follow-on researchers.

One alternative explanation for the trends that did materialize is that the commanding officer's impact alone did not precipitate the change. Other organization-wide influences may operate; viz. a new Executive Officer, new Command Master Chief, or new Command Career Counselor. Thus, management personnel throughout the chain of command combine to bring about changes in the organizational environment.

In addition, other forces may have been at work. Ships are sometimes plagued by chronic engineering problems which can result in prolonged periods of poor crew morale. This situation would foster a deteriorating organizational

environment with subsequent low reenlistment rates. Effects of such circumstances could linger from one commanding officer tenure to the next. These situations are largely irreparable no matter who takes command. All these arguments lead to the question, Can one person alone really make a difference? This is a question which will remain momentarily unanswered.

F. IMPLICATIONS

This thesis supports the claim that the commanding officer is a significant factor in reenlistment decisions. Although the direct influence of a given commanding officer on a given individual's decision cannot be demonstrated, aggregate results do suggest that the commanding officer is an important factor within each command. As seen in the delta plots, a commanding officer may precipitate a shift of as much as 40 percent reenlistment rate. (See Figure 6.3.) Based upon an elasticity of one percent pay increase for each two percent improvement in reenlistment rate, this equates to certain commanding officers retention ability being worth a 20 percent adjustment in enlisted pay.

G. HOW COMMANDING OFFICERS MAKE AN IMPACT

If one accepts that the commanding officer is a significant factor, and his impact is delivered through the organizational environment, the question is then raised, What specifically can a commanding officer do that would impact the EOE and promote improved retention? The answer is complex, and deserves scrutiny by follow-on researchers; however, there are enough visible contrasts in leadership styles to provide an intial response.

People- oriented commanding officers, such as those described by Gullickson and Chenette, put a great deal of

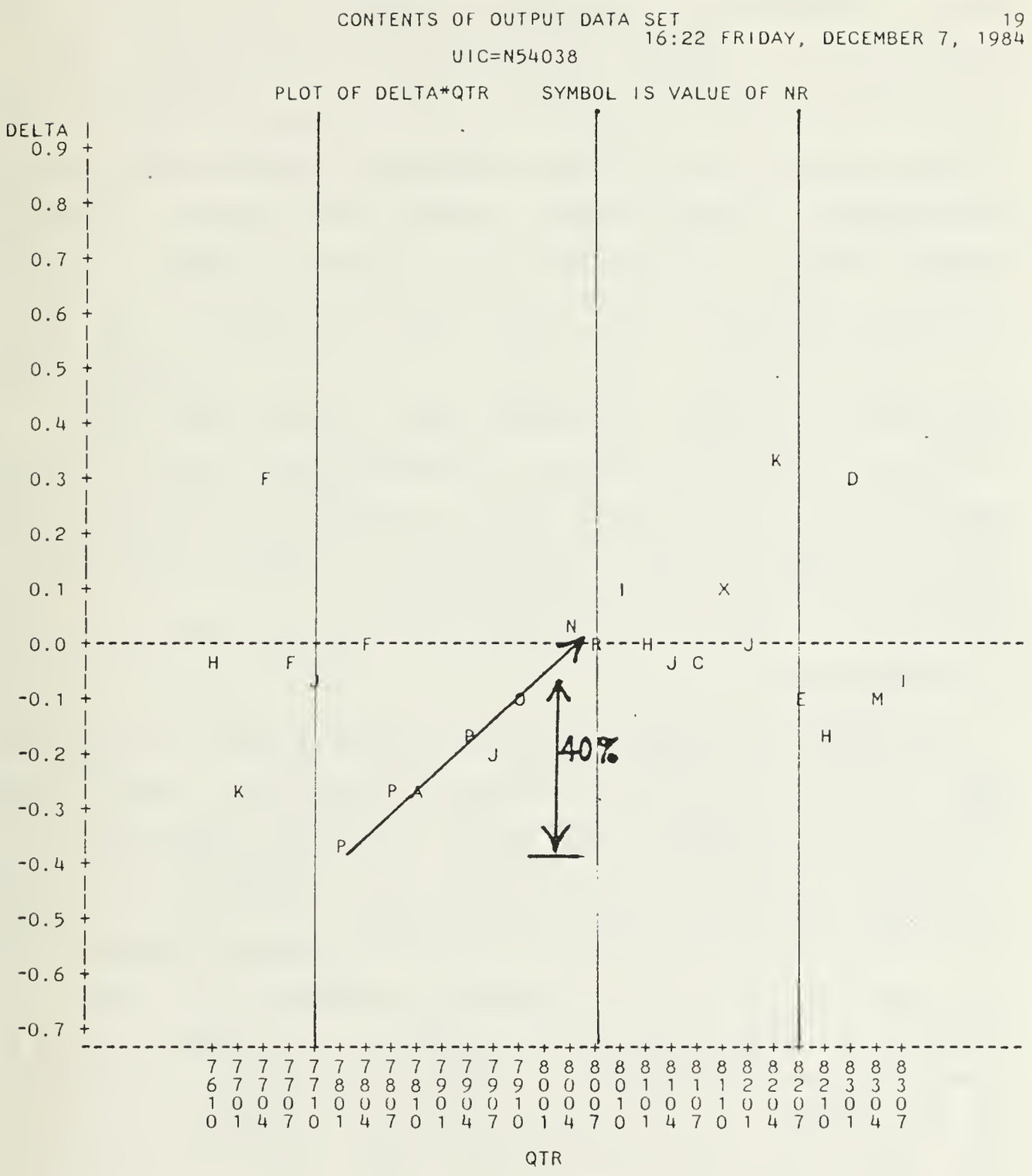


Figure 6.3 Delta Shift Example.

personality and charisma into their retention efforts. Letters to parents and spouses from the command indicating achievements of the unit or individual promote individual pride. Recognition ceremonies onboard ship before the assembled crew, command social events, an efficient retention program, person to person contact by the commanding officer, and other command sponsored programs add up to special touches which promote a healthy command environment. On the opposite side of the spectrum is the results oriented skipper who may not be as attuned to personal needs. These commanding officers may also be successful retainers because sailors are proud of competitive ships, the ones that seem to be "out in front." This feeling of pride and recognition translates into good morale and organizational commitment.

A more in depth answer to this question would be of significance to the Navy, and judging by the amount of research already completed concerning organizational environment, the answers may already exist.

H. YARDSTICK

Although raw reenlistment percentages (gross or eligible only) may not be valid 100 percent of the time, their ease of calculation makes them the best available approximation of command retention capability. A comparison of unit percentage with the average of the same class units in the same homeport may be used to judge the retention capability of a command, as well as provide a barometer by which the commanding officer and unit commanders can gauge a unit's organizational environment. Retention is only a symptom, not the problem. Continued low retention compared to the fleet norm may be a warning signal that the command climate needs improvement.

I. SO WHAT?

Marty Binkin [Ref. 42] pointed out in his 1984 book on the All-Volunteer Force:

1. with the nation's economy improving,
2. employers looking for people with increased technical skills, and
3. demographics declining (fewer accession age males),

the AVF is in for hard times. These factors, coupled with the Navy's surge to a 600 ship fleet, makes the challenge of staying manned with the highest quality personnel a difficult one. The Navy must react with a broad spectrum of initiatives.

The influence of the commanding officer through the organizational environment must not be discounted by policy makers or researchers. To rely solely on the lure of increased pay as the primary answer to declining reenlistment rates is false security as pointed out by Dr. A.J. Martin, former Director for Accession Policy, Office of Secretary of Defense [Ref. 43]. He insisted that our federal budgetary cycle is too cumbersome to depend on to provide the quick dosage of money that would prevent the mass exodus of personnel experienced in the late 1970's when a strong civilian economy prevailed. Additionally, reliance on fiscal remedies runs counter to the current government austerity measures, and may not be depended upon regardless of the budgetary lag.

Improvement of the organizational environment, although a more complex solution, must be developed as an alternative to fiscal measures. Close attention must be given to the volumes of research that has been completed addressing the factors that form a person's perception of military life. These factors need to be presented in detail for all levels of management to study and address.

Can one person make a difference? Researchers think so. Thornton, et al [Ref. 44], in studying the critical leadership incidents in the Navy concluded, "Leaders can influence the outcomes of problem situations they face. The use of certain modes of interpersonal influence have a direct bearing on the outcome." In other words, commanding officers can deal with retention problems if they know where the source is.

J. STARTING POINT

Retention training for commanding officers and executive officers is minimal at present. Occasional "helpful hints" and success stories are the extent. No detailed study of problem sources and possible solutions are available to these "local" managers. At present, the bulk of training is devoted to Command Career Counselors. However, a retention oriented organization requires expertise and ability at all levels. A career counselor is impotent in the face of a commanding officer who is ignorant in regard to good retention practices.

Finally, commanding officers, especially those that are mission oriented, must gain an appreciation for the idea that a skipper who is people oriented is of great value to the Navy. A good retaining skipper is ensuring that the Navy can not only do the job today, but also will be able to do the job in the future because he is retaining the people who have the requisite experience and training. Retention means long range readiness.

K. RECOMMENDATIONS

As stated at the outset, this research is an attempt at ground breaking for a new method with a different perspective. The primary goal is to provide a stepping stone for

follow-on researchers. The next step in validation of the methodology developed here would be to compare the delta trends for each commanding officer with the Enlisted Exit Questionnaire data to see how the questionnaire results correlated with the best and worst retainers. Is there a discernable outlook difference among sailors leaving a positive retaining command versus those leaving a negative retaining command? Lack of significant fleet feedback in the form of questionnaire submission prevented this correlation from taking place in this thesis.

A new questionnaire, the 1982 Enlisted Retention Questionnaire has the potential to be a rich source of data which could be correlated with the delta trends. Instead of examining how poor retaining commanding officers affect leavers, this questionnaire will provide some insight into the effects of good retaining skippers on those personnel that reenlist.

One possible follow-up would be a detailed look at those commanding officers who were considered to have a positive impact on reenlistment. Close analysis of their methods and leadership would help to pinpoint their influence on the organizational environment. In addition, a longitudinal study of commanding officers who retained well during their first command tour in comparison to subsequent command tours would also improve the knowledge base.

The Navy must pursue the skipper factor to the fullest. To leave it and other organizational environment factors unattended would be to deny seeking an efficient and cost-effective solution to the retention problem.

APPENDIX A
DATA SOURCES

The sources of data for the data base were as follows;

1. Defense Manpower Data Center, Monterey, California. Provided personnel biographic, demographic, and service history related information.

2. Naval Historical Center, Washington, D.C. Provided names and tenure of commanding officers.

3. Commander Naval Surface Forces Pacific, Coronado, California. Provided underway schedule files from which underway dates and Operational Propulsion Plant Examination (OPPE) dates were determined.

4. Navy Personnel Reaearch and Development Center, San Diego, California. Provided Enlisted Separation Questionnaire results.

5. Deputy Chief of Naval Operations (Manpower, Personnel and Training), Officer and Enlisted Retention Programs Section (OP136D). Provided reenlistment figures and Selected Reenlistment Bonus data.

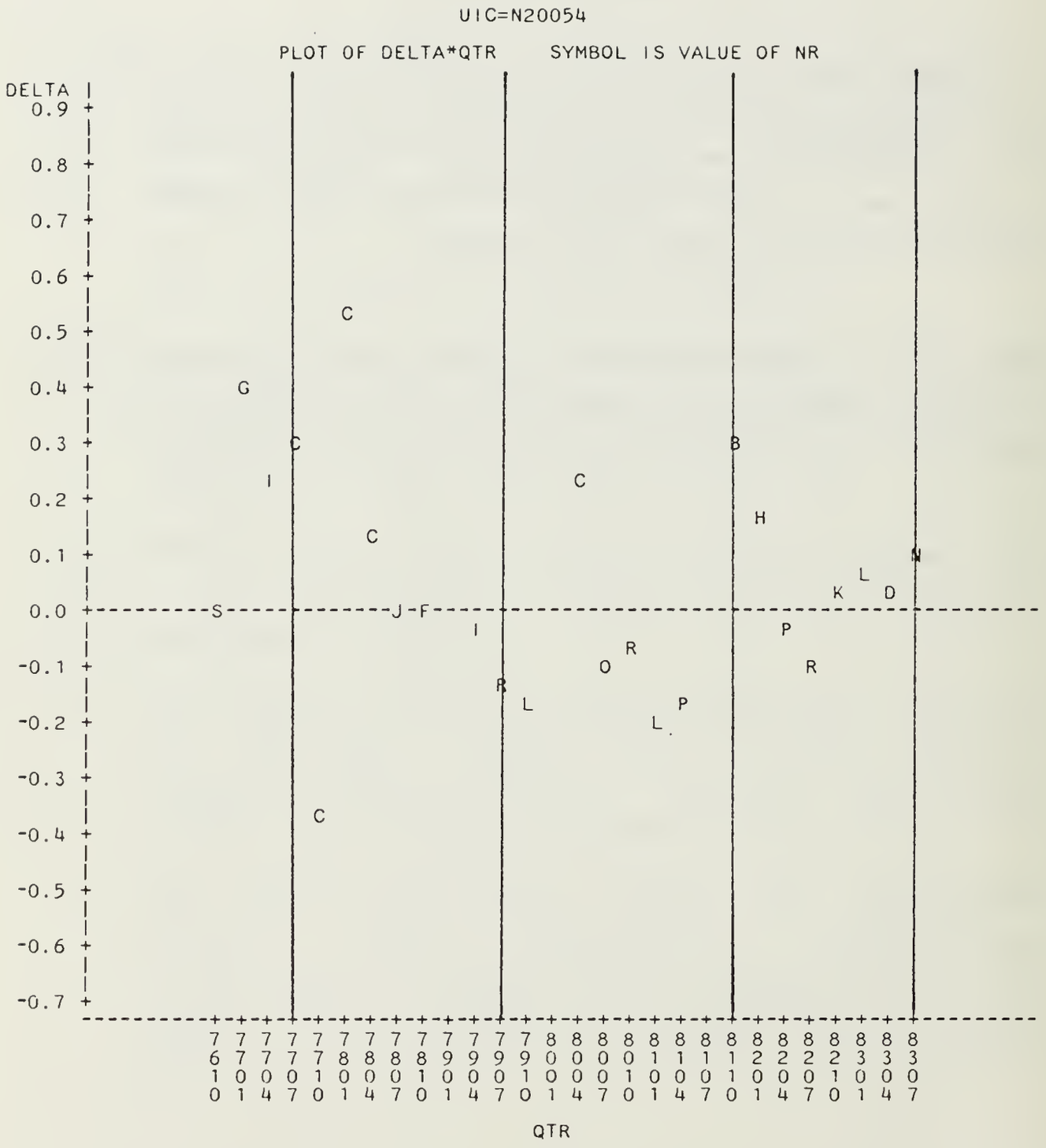
6. Navy Ships Parts Cntrol Center, Navy Maintenance Support Office Department, Mechanicsburg, Pennsylvania. Provided Steaming, Operating, and Fuel Listing which was used to determine actual underway time.

APPENDIX B

DELTA PLOTS

The enclosed plots indicate the mean delta for each of the 17 San Diego based fast frigates for each fiscal year quarter during the period October 1976-September 1983. Data for the two quarters beginning January 1979 (7901) and January 1980 (8001) were not available.

Note: The N's for each ship for each quarter are indicated on the plots by the letter used for the plotting symbol. An "A" equals 1, "B" equals 2, etc., up to "Z" equal to 26.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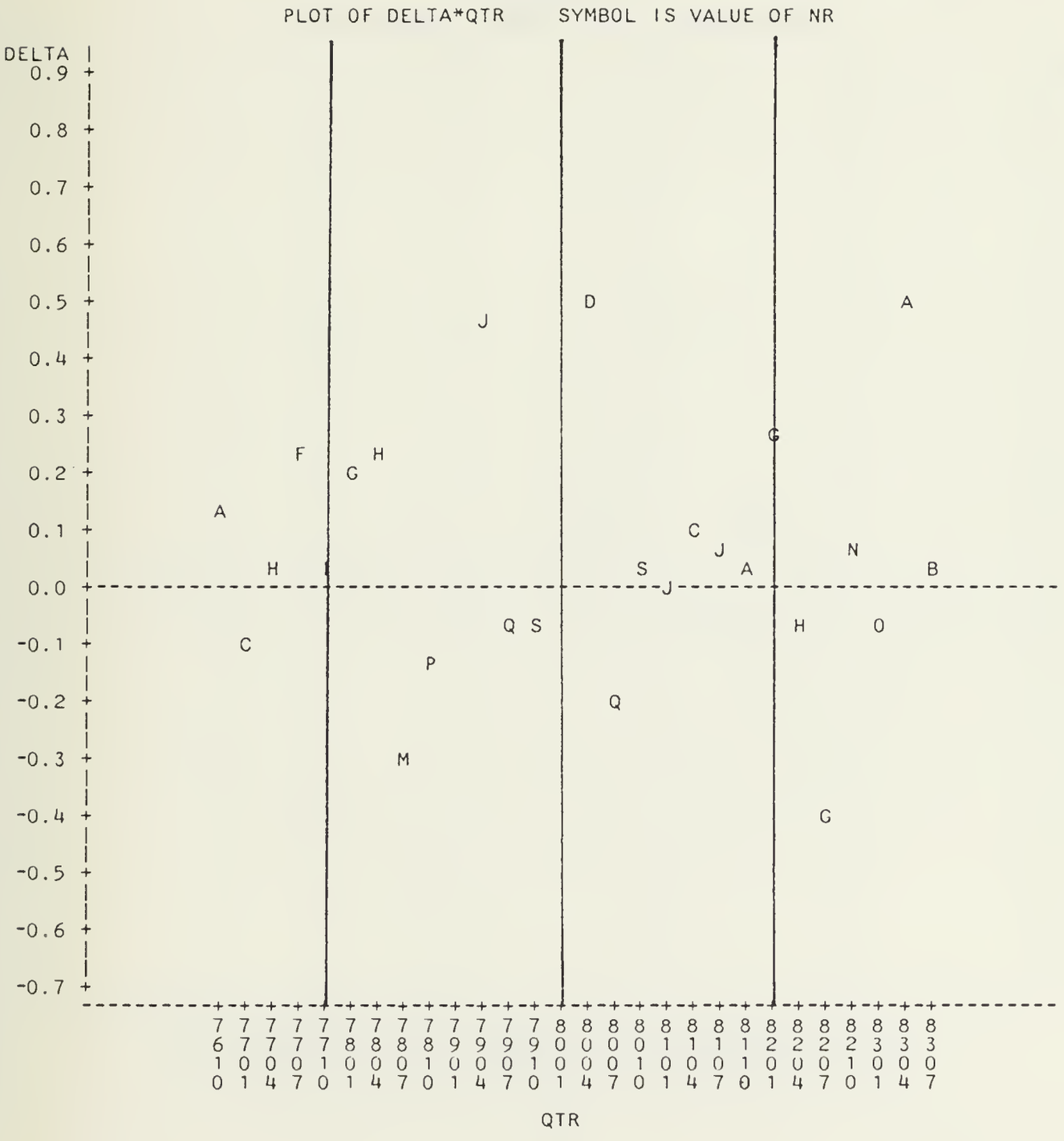
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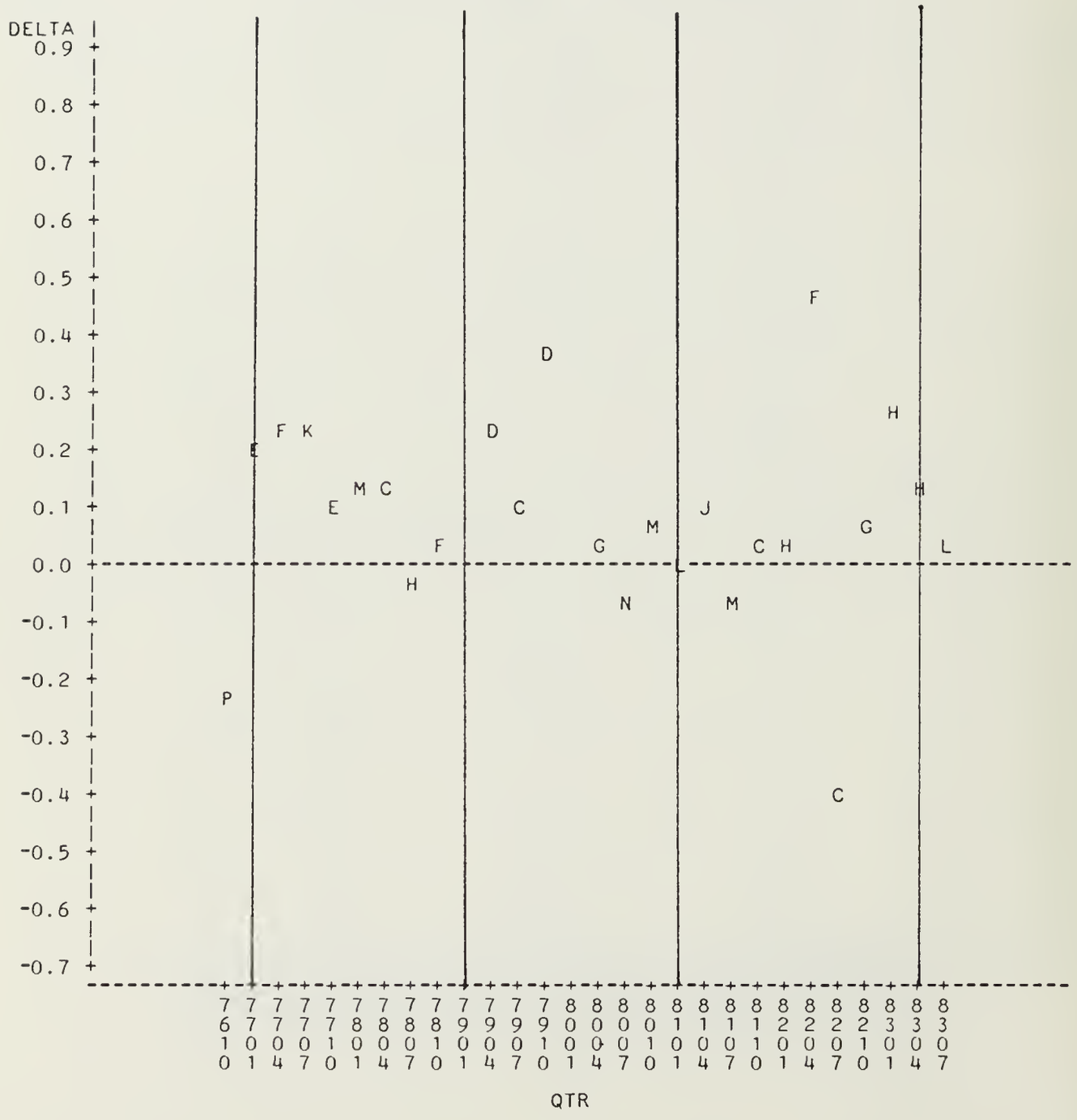

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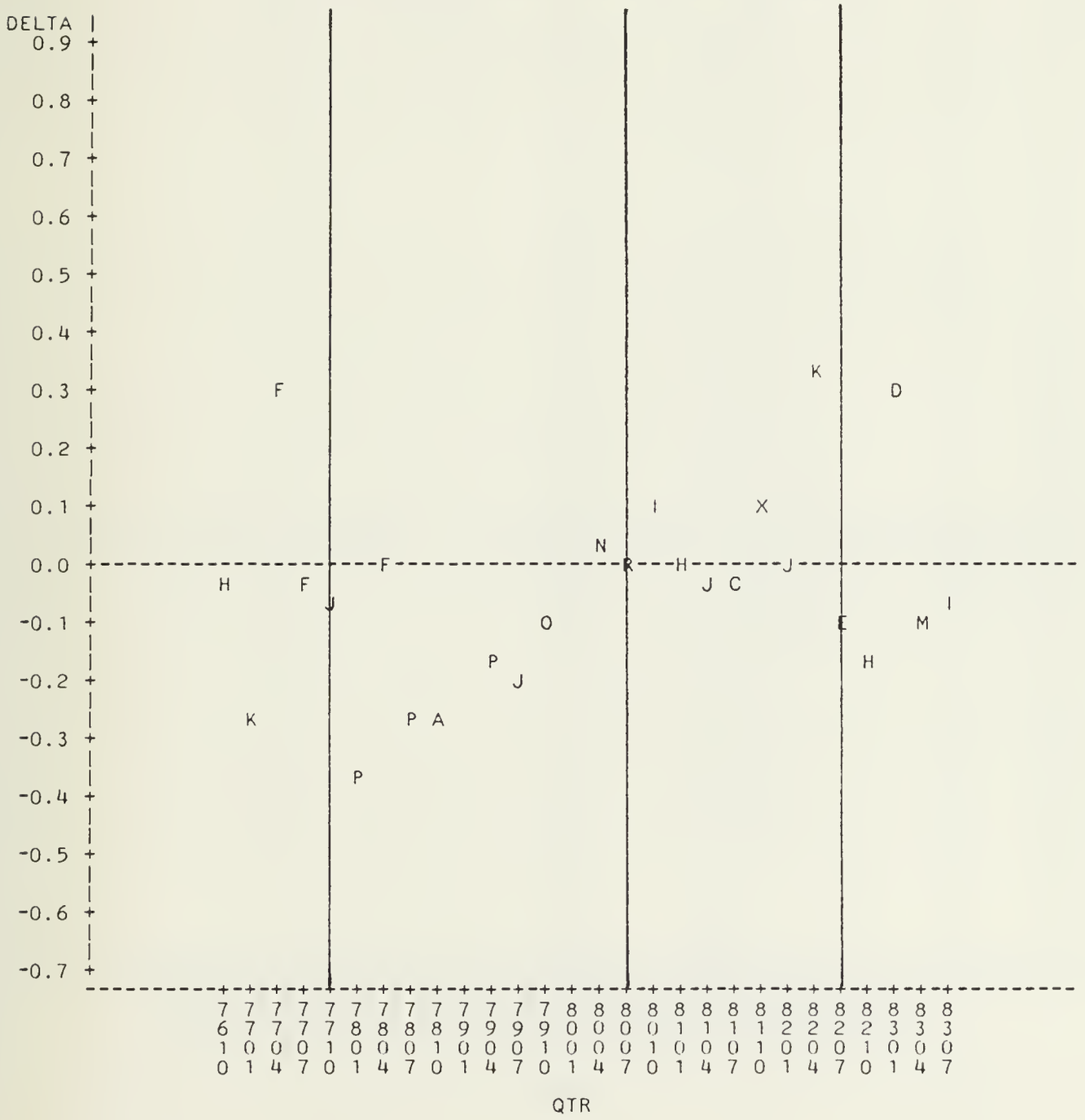

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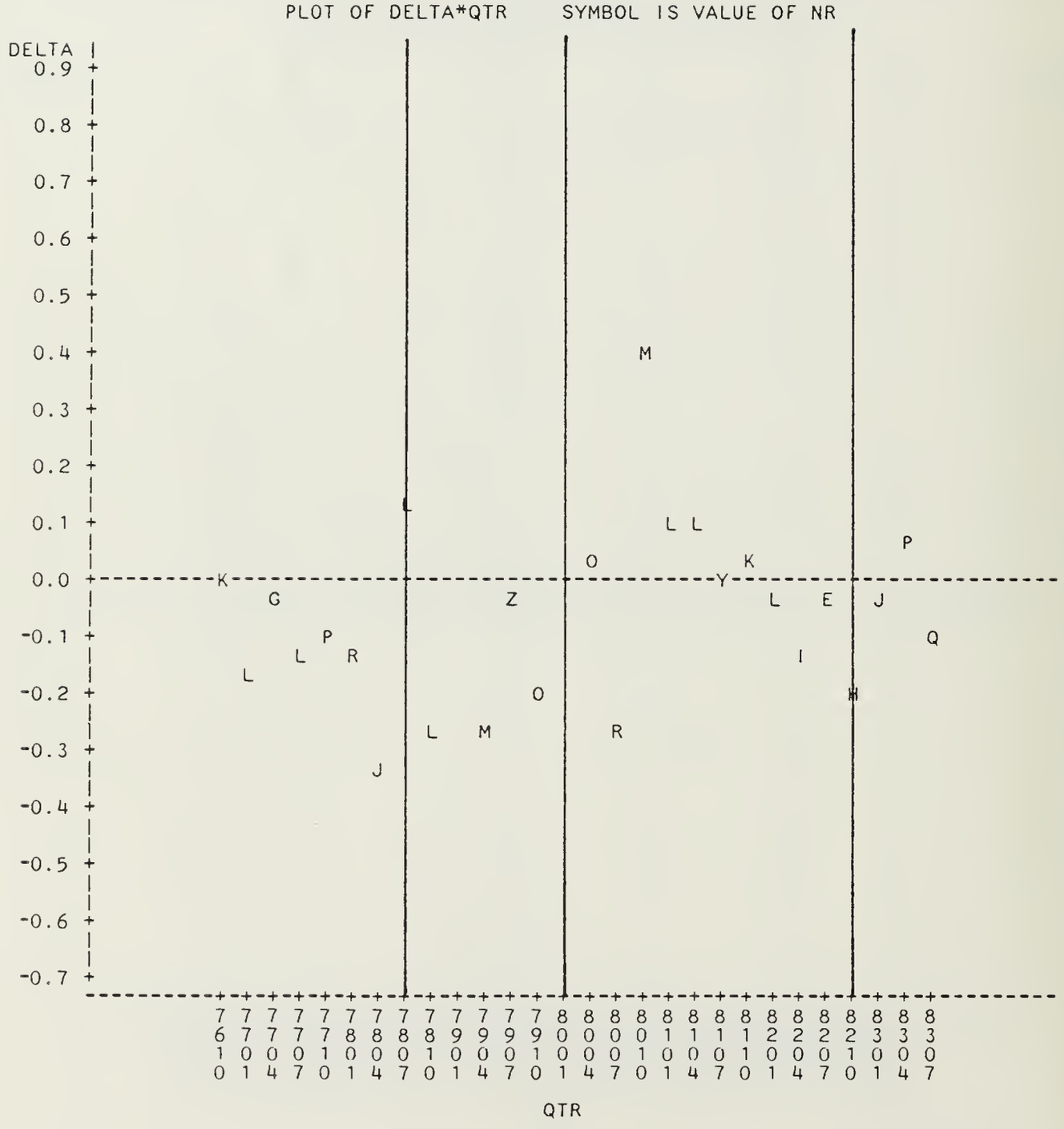

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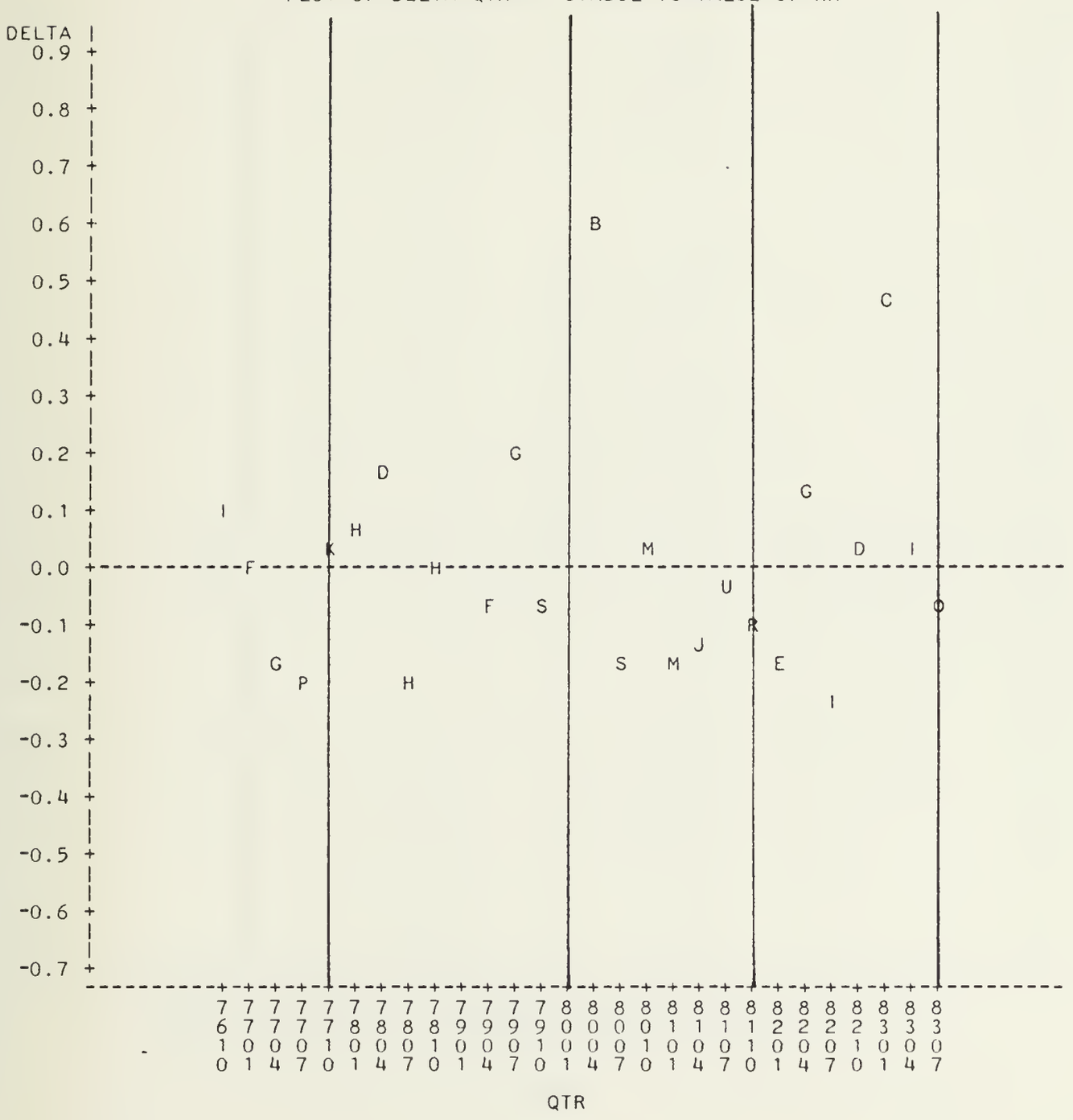

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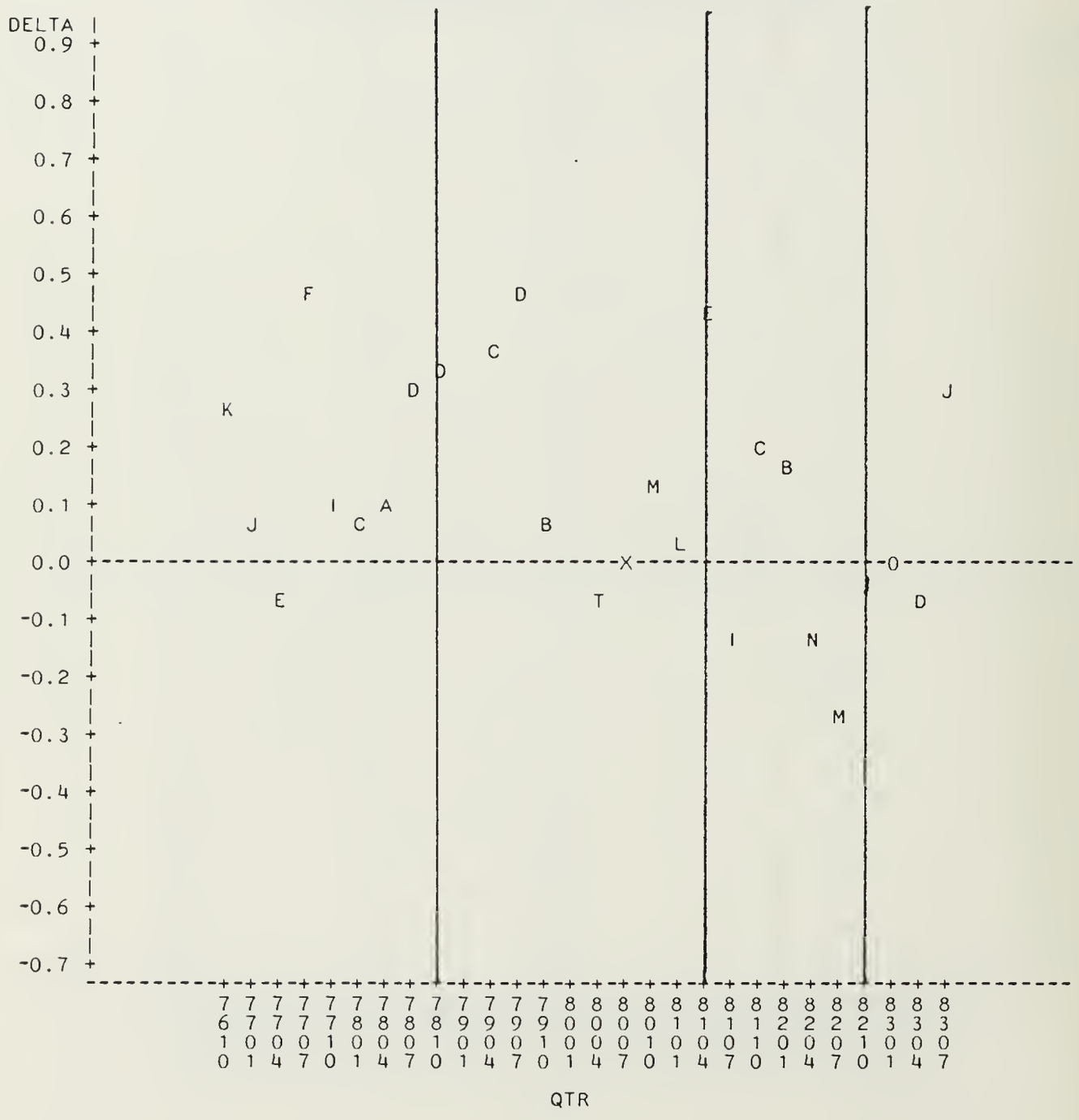

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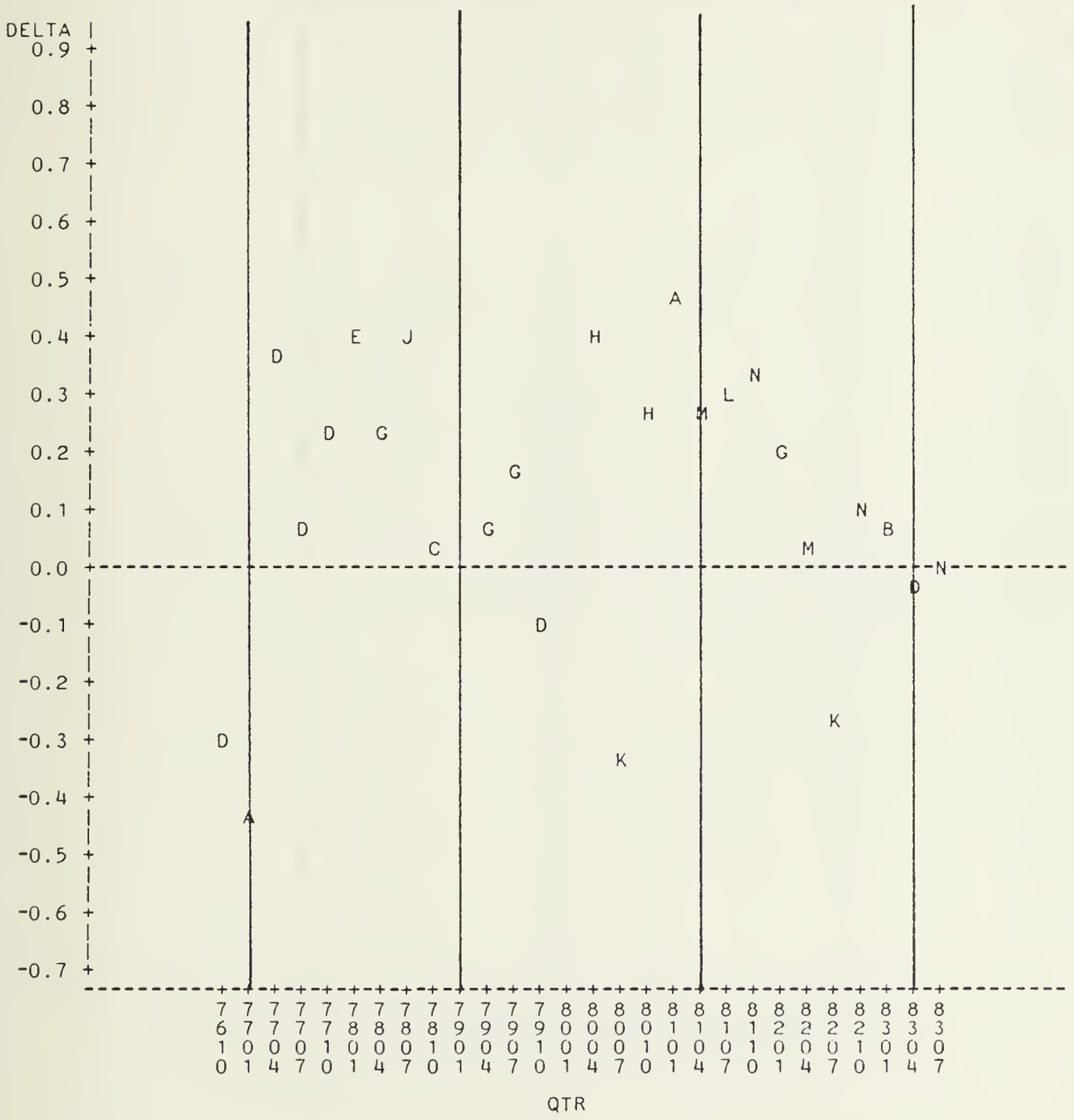

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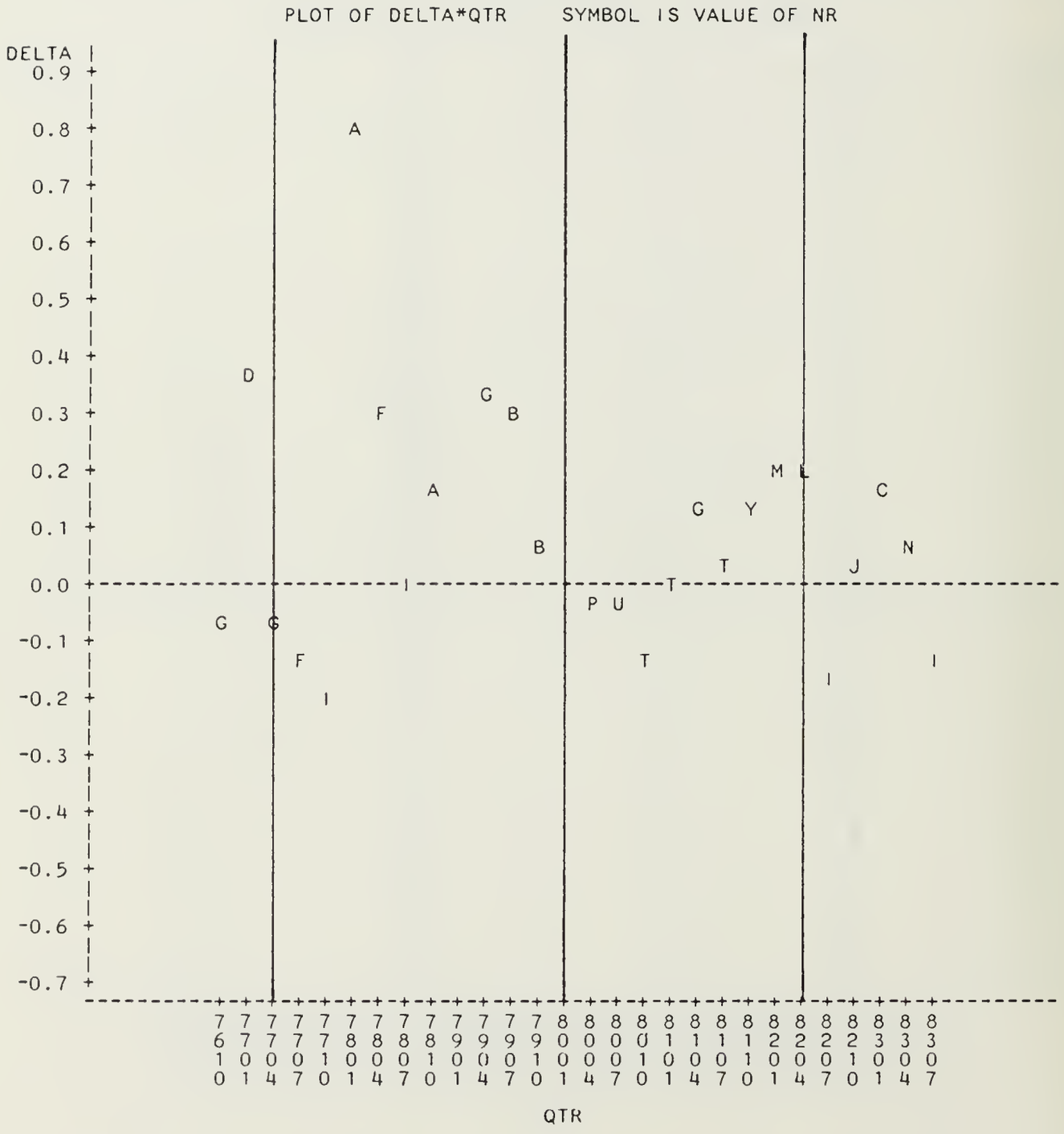
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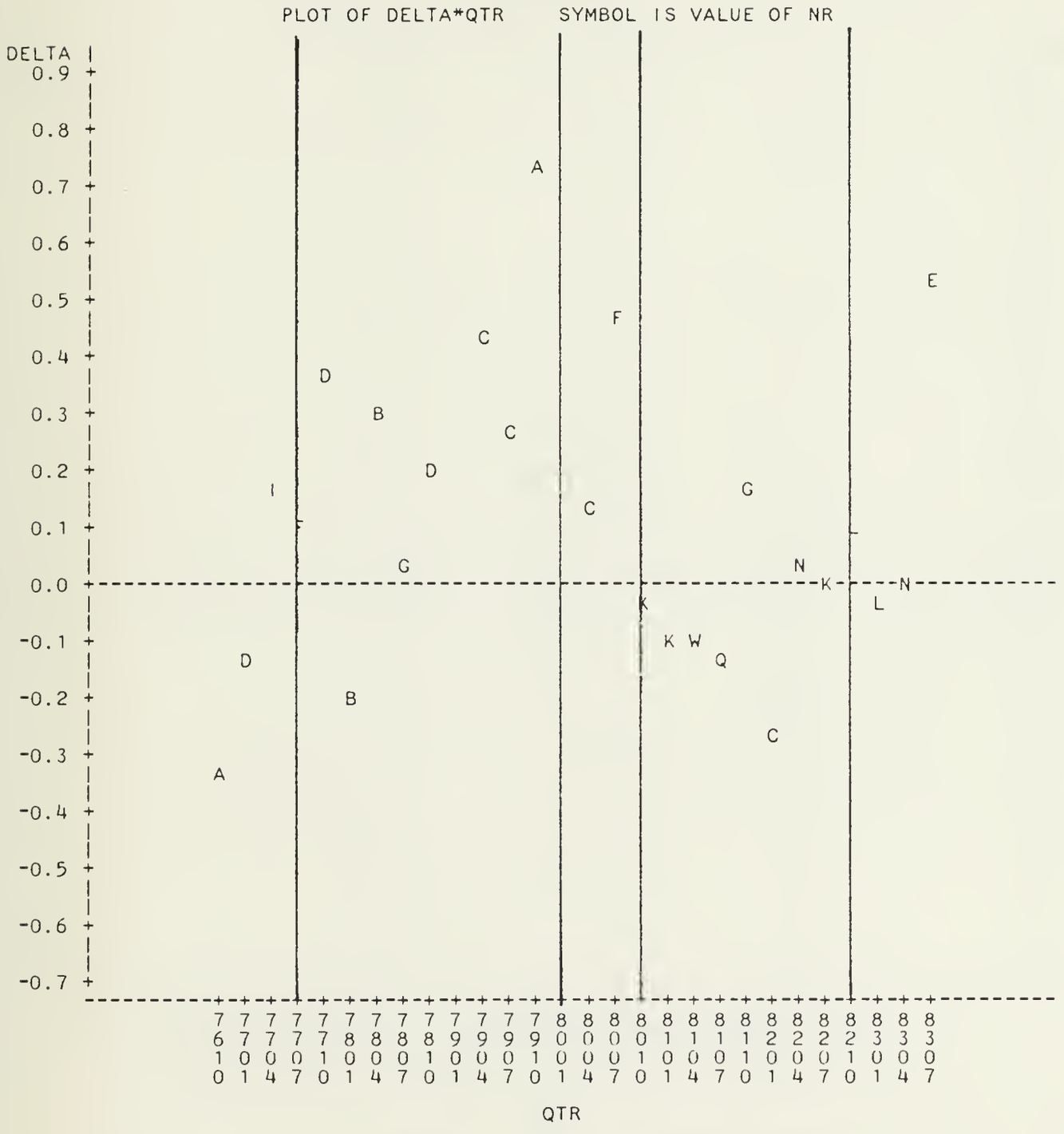

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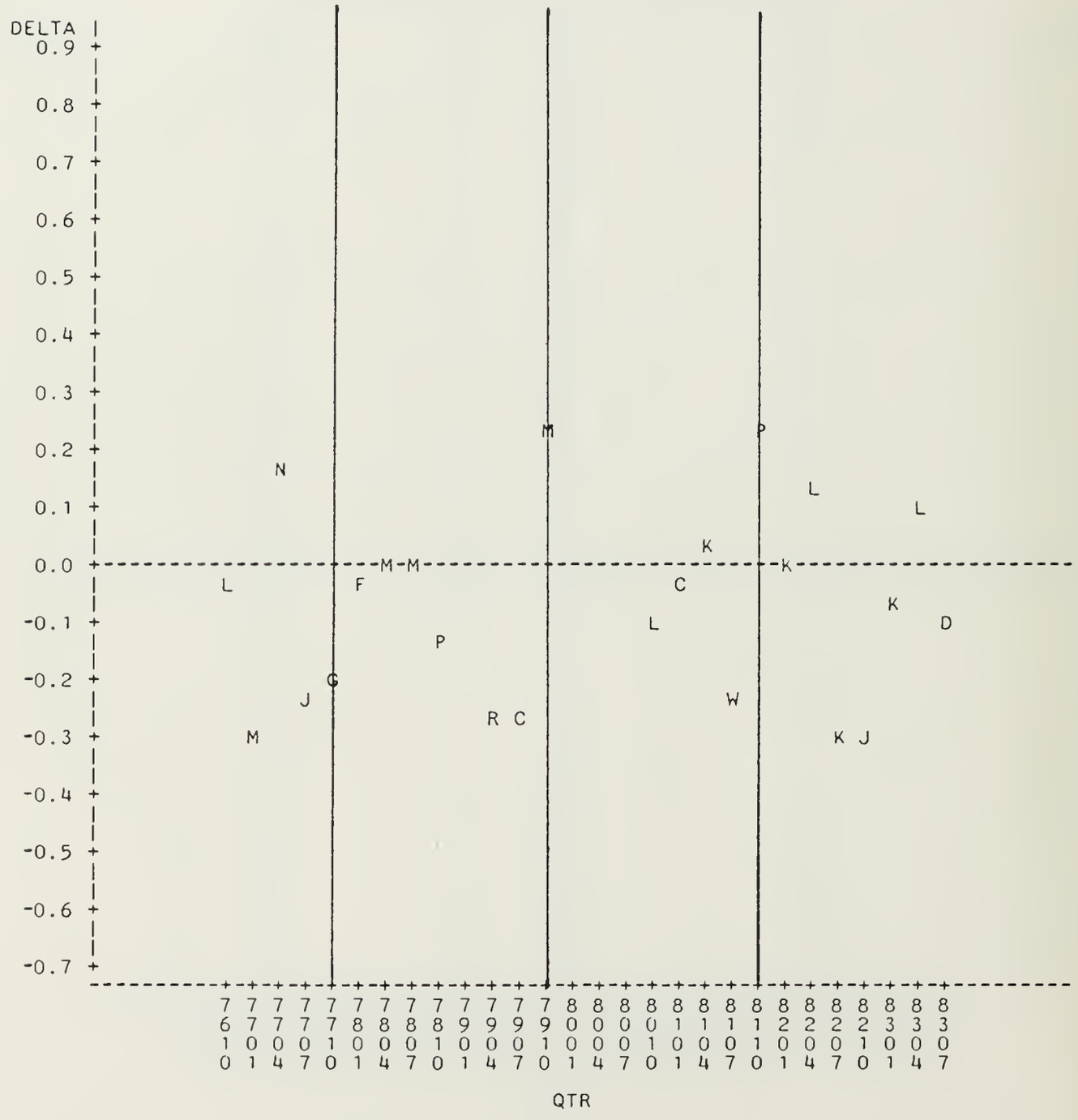

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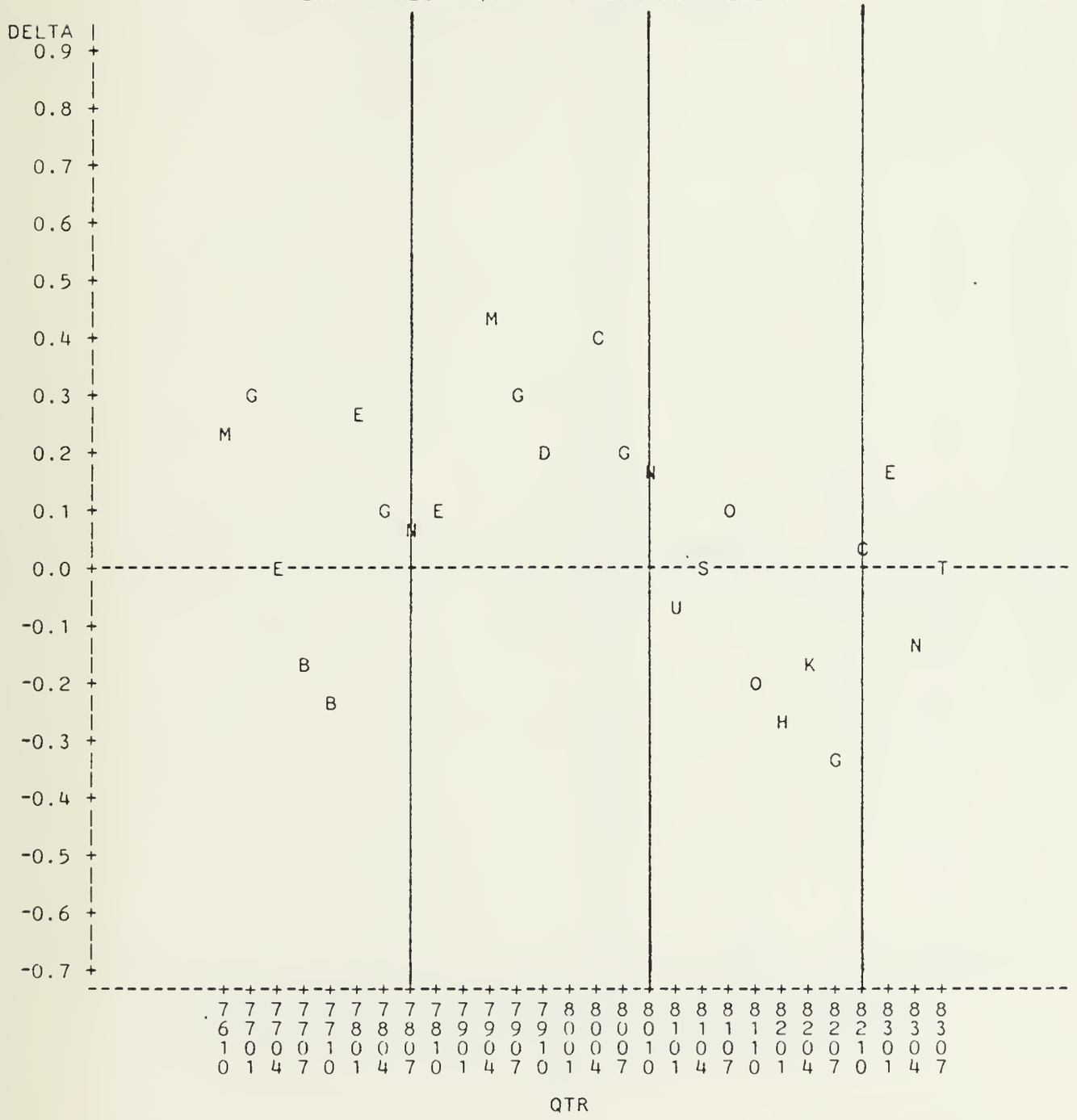

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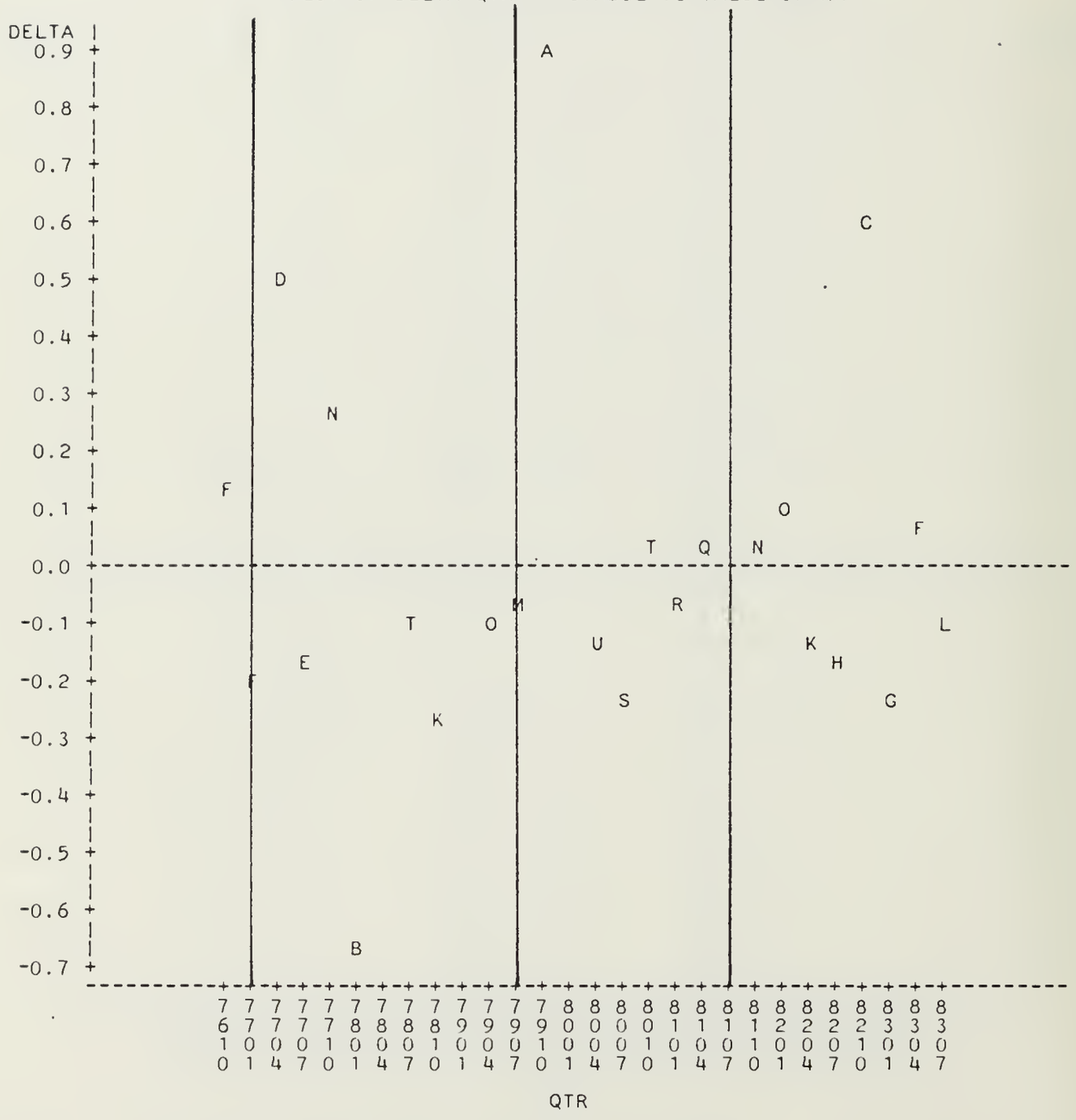

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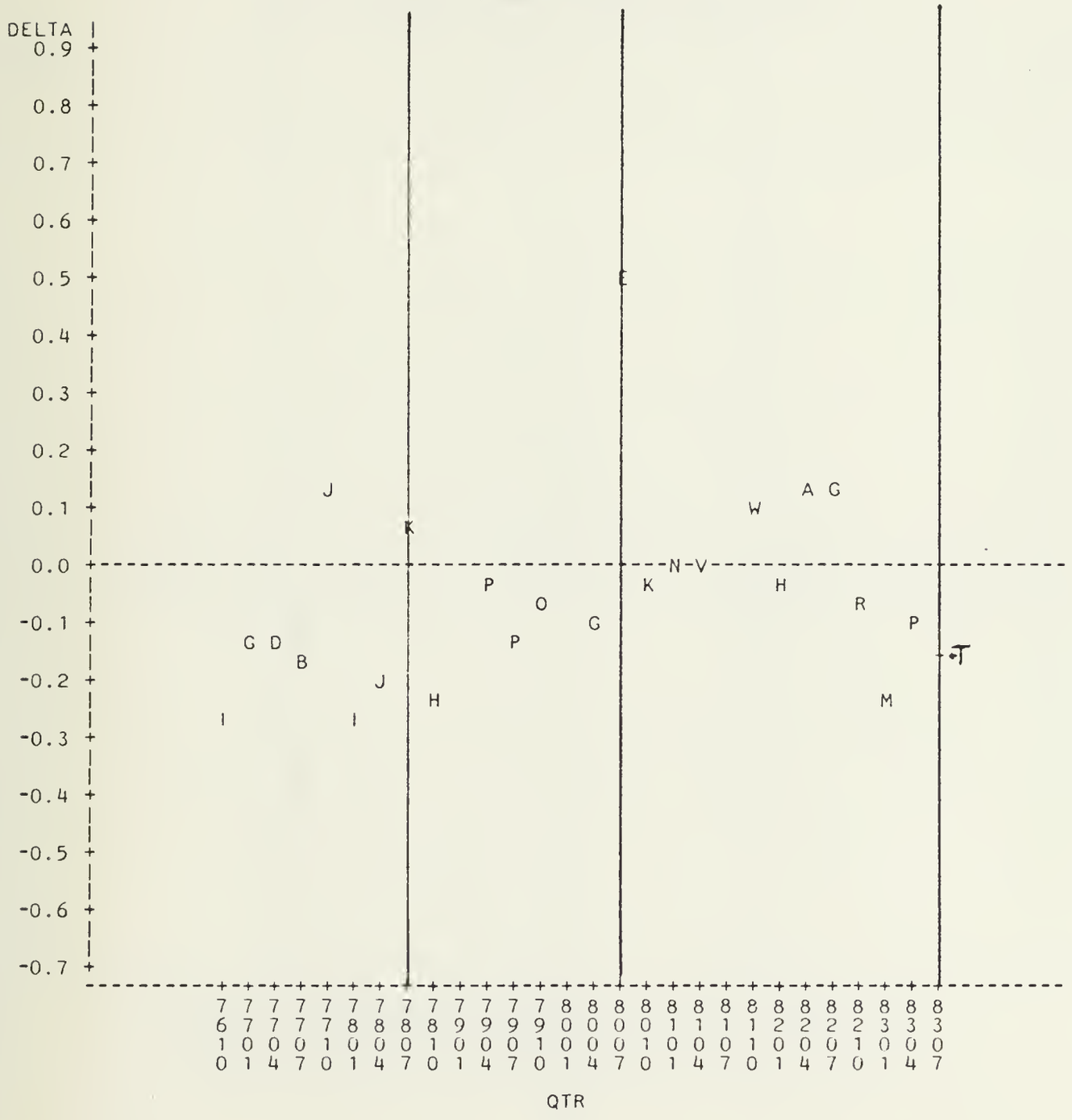

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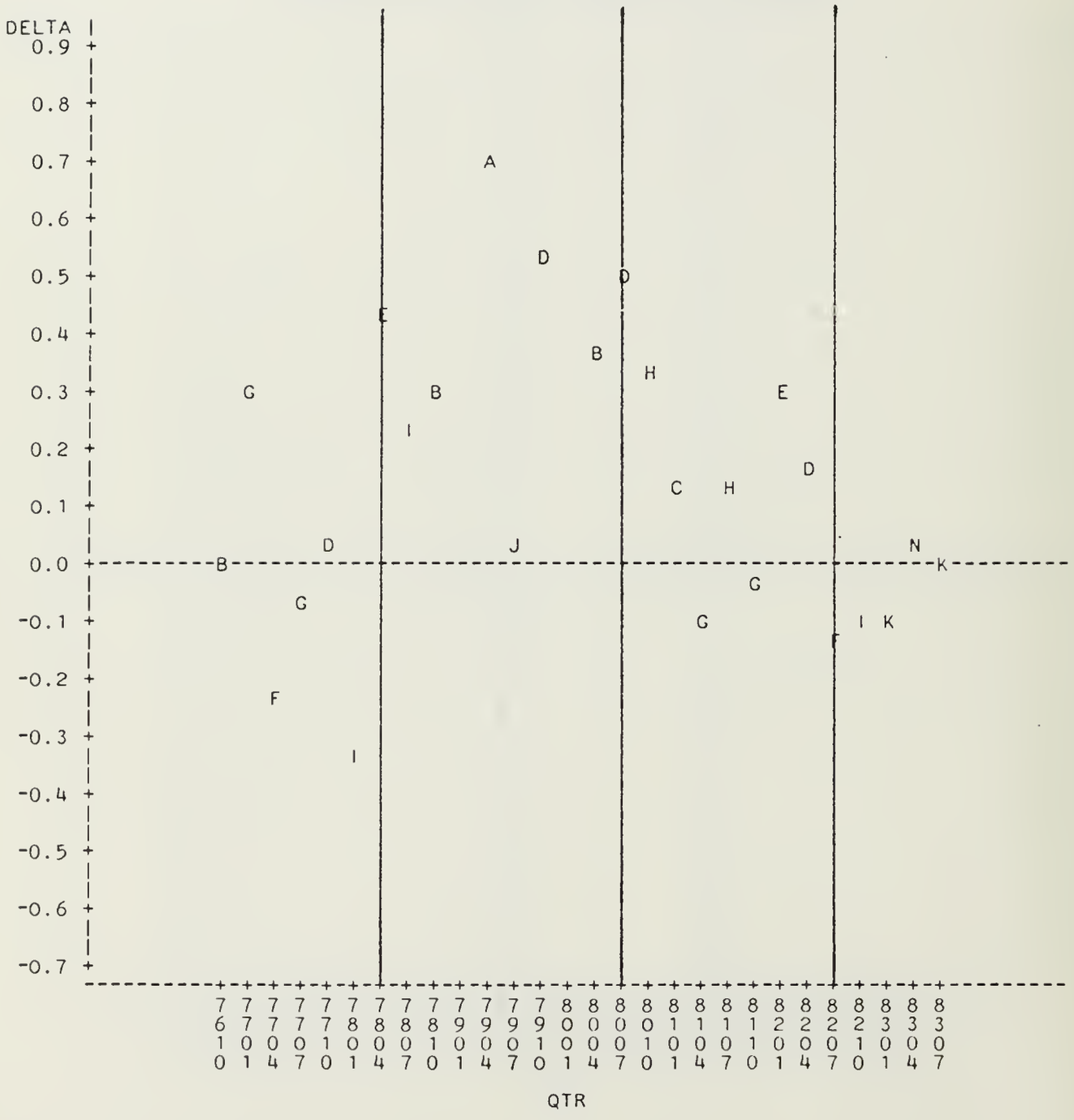

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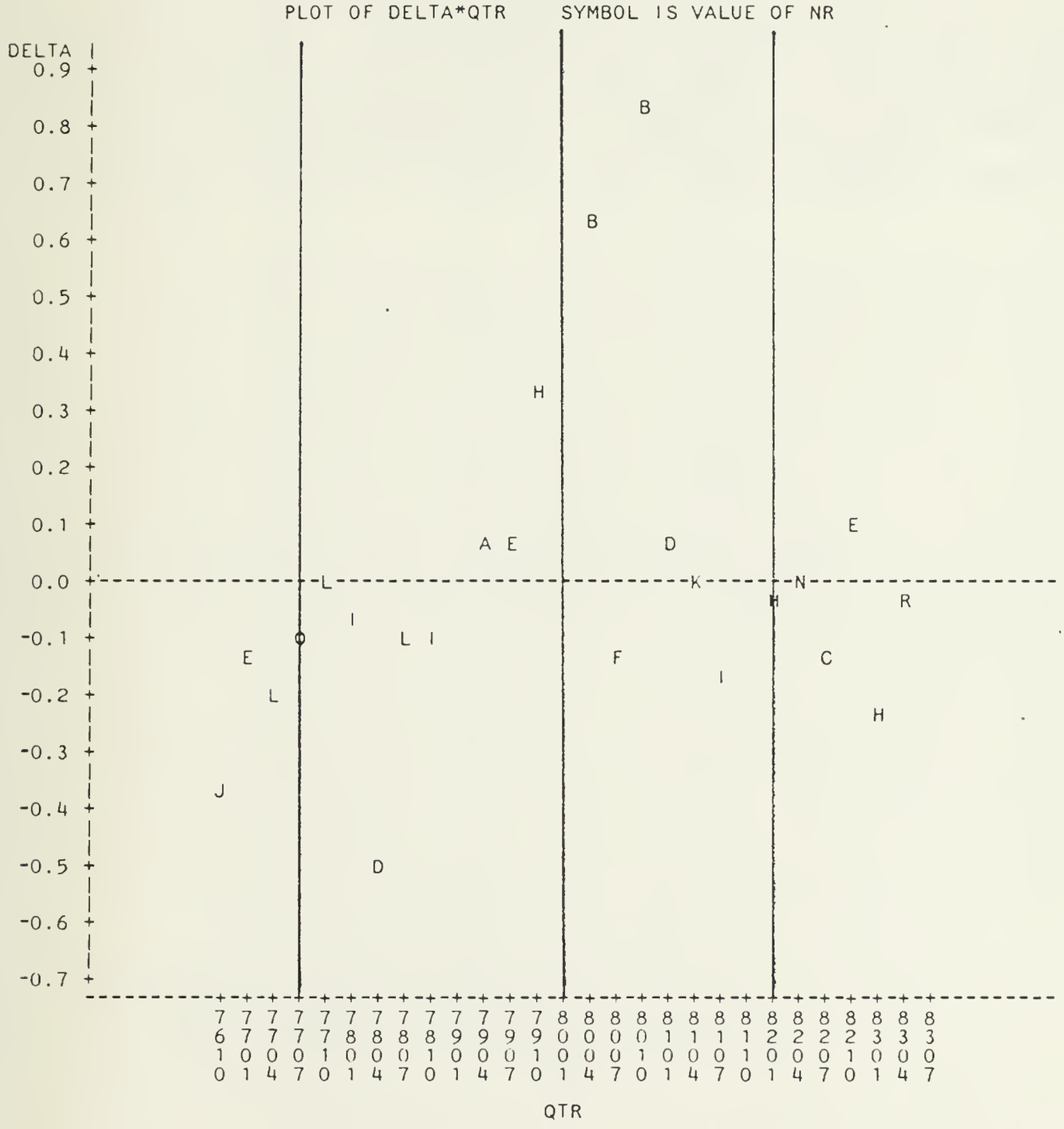

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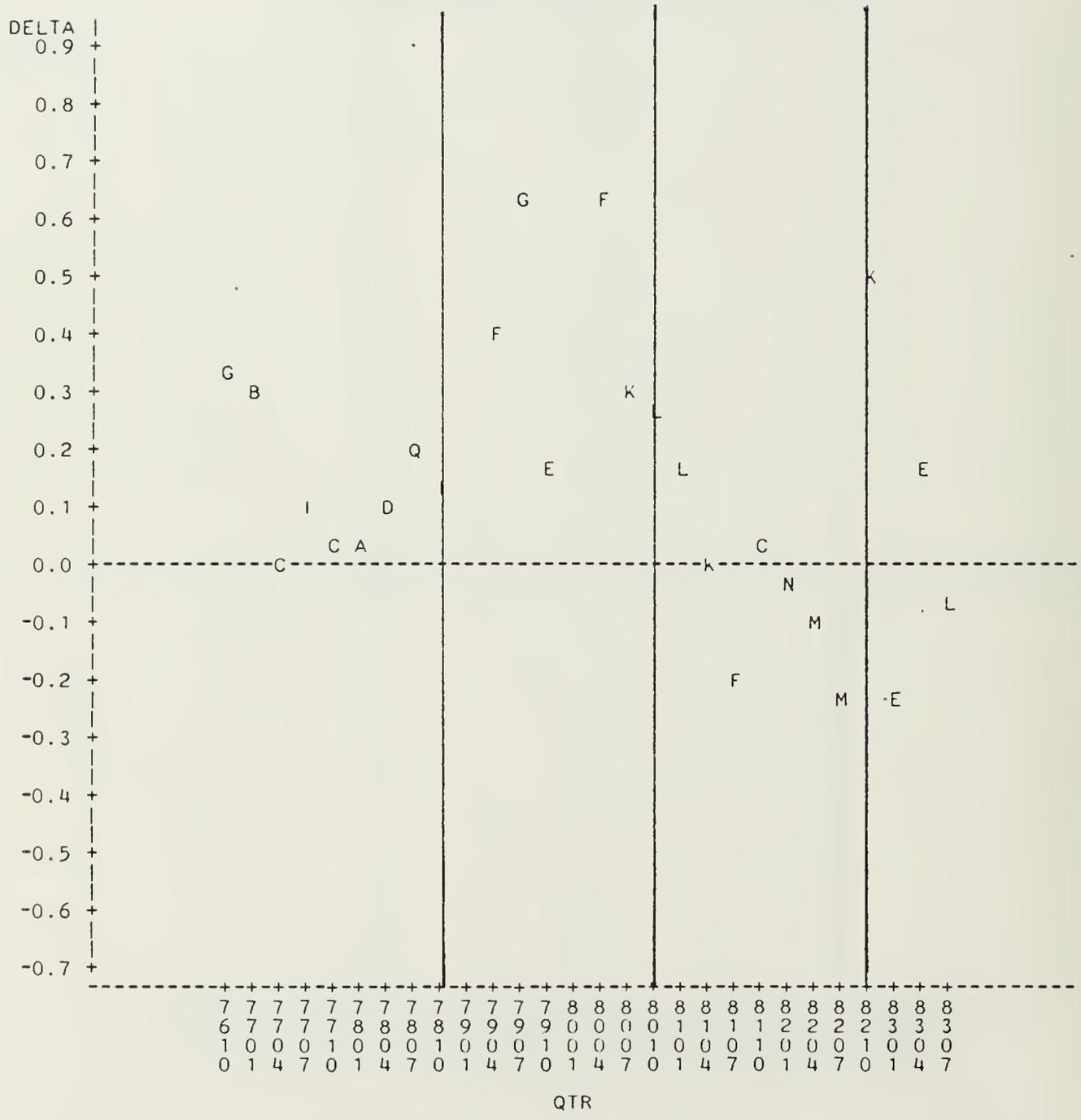

APPENDIX C

SHIP REENLISTMENT RATES (ELIGIBLE)

The enclosed plots indicate the reenlistment rate (eligible only) attained by each of the 17 San Diego based fast frigates for each fiscal year quarter during the period October 1976-September 1983. Data for the two quarters beginning January 1979 (7901) and January (8001) were not available.

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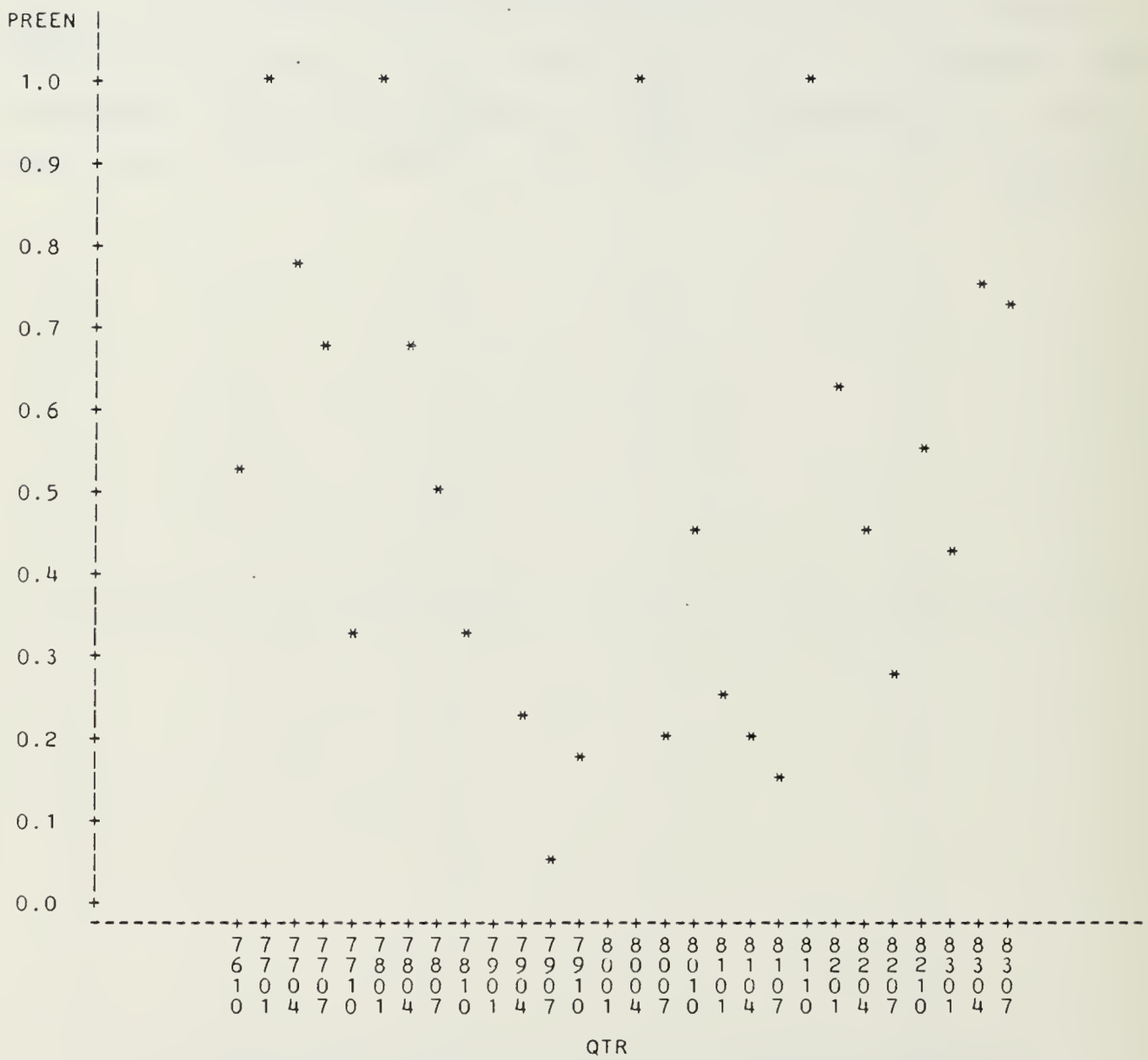

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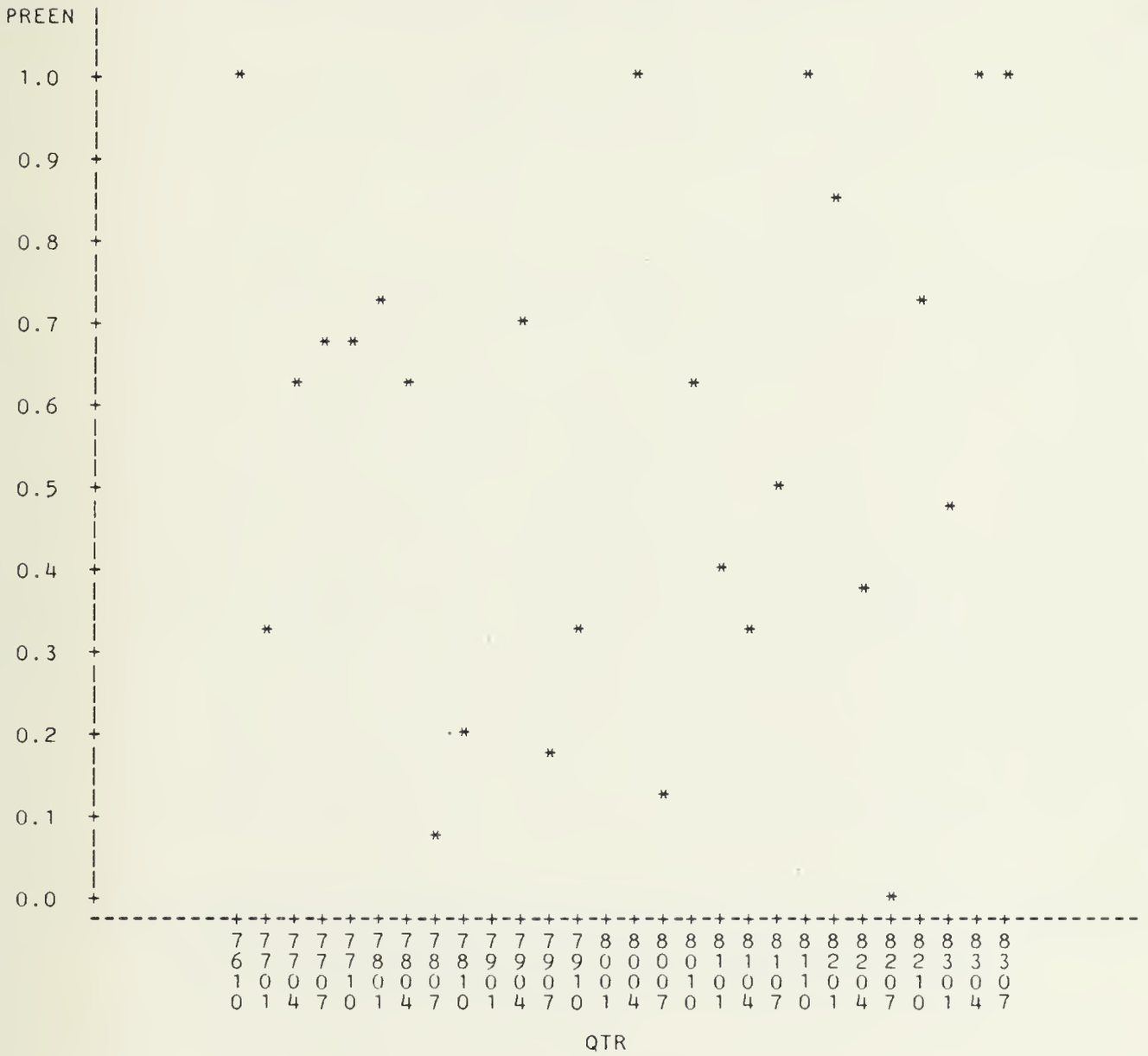

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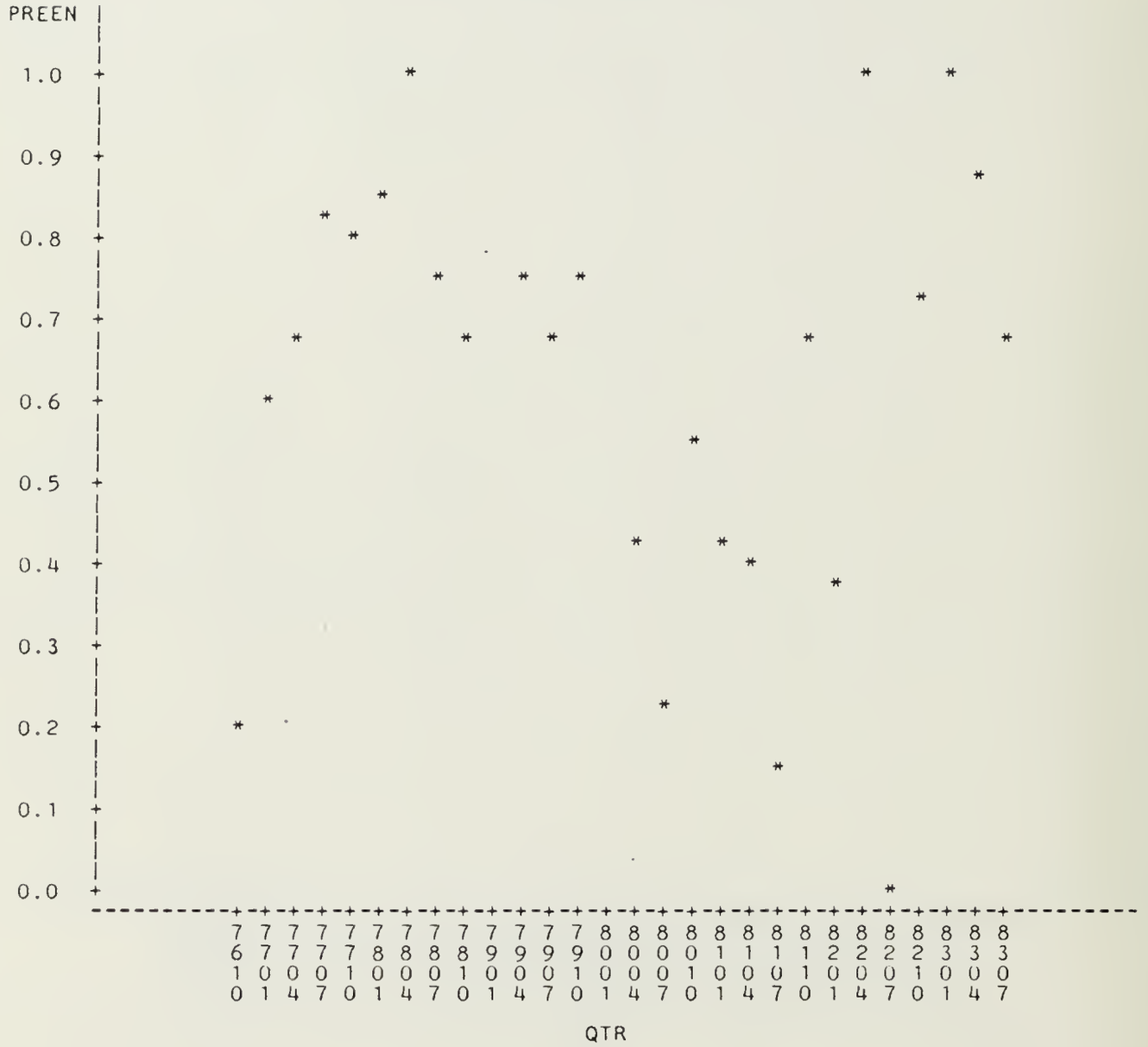

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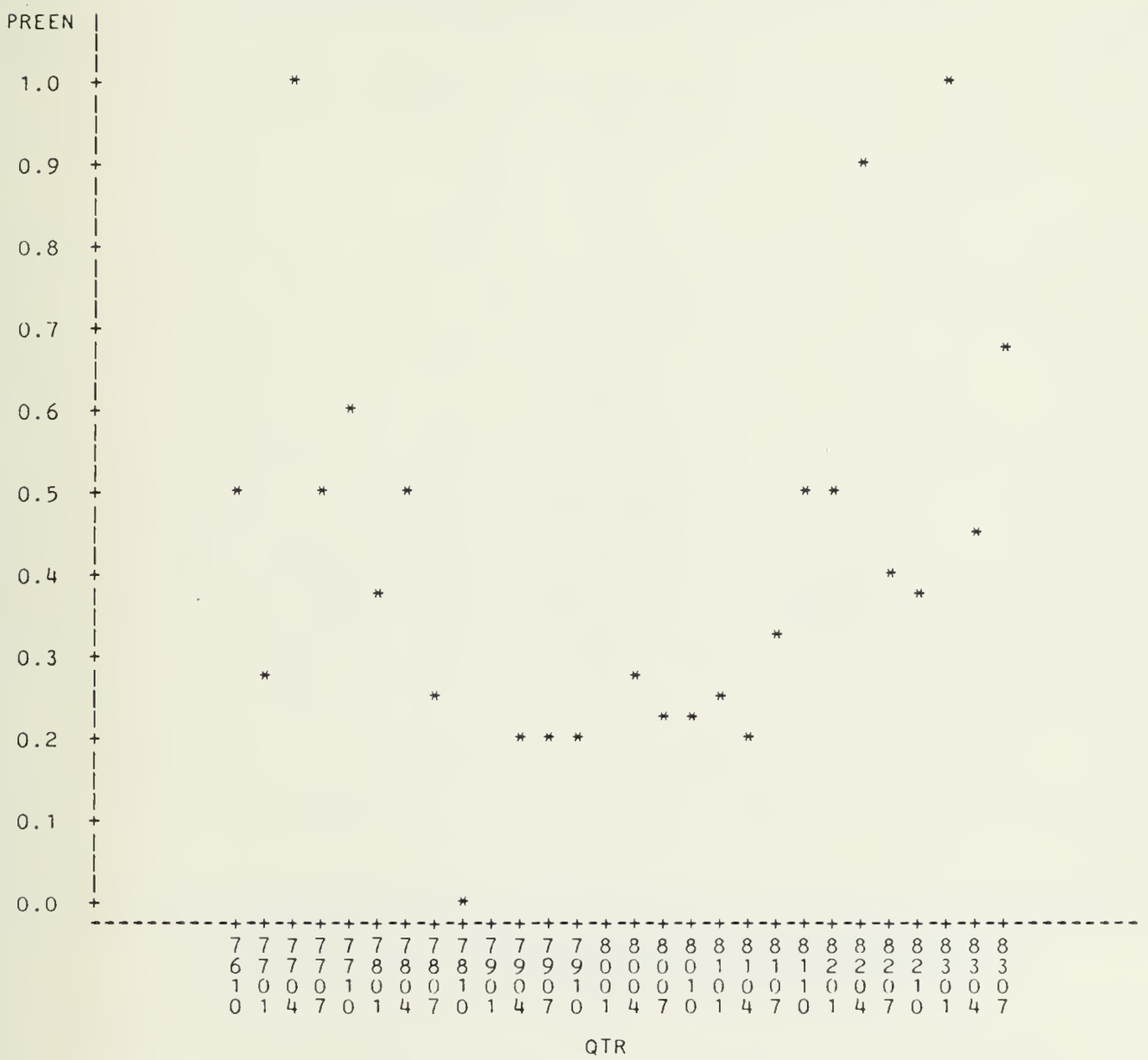

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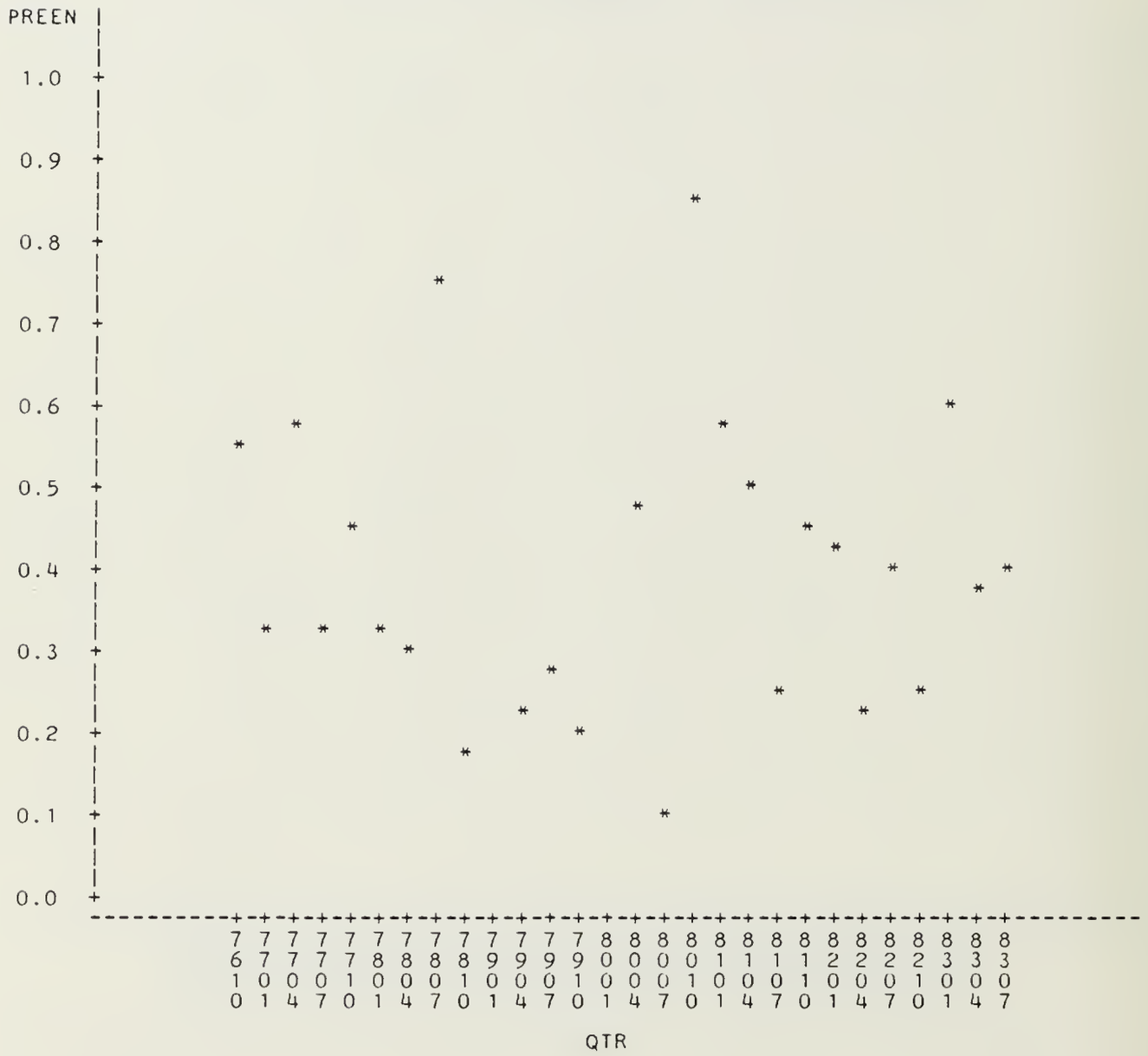

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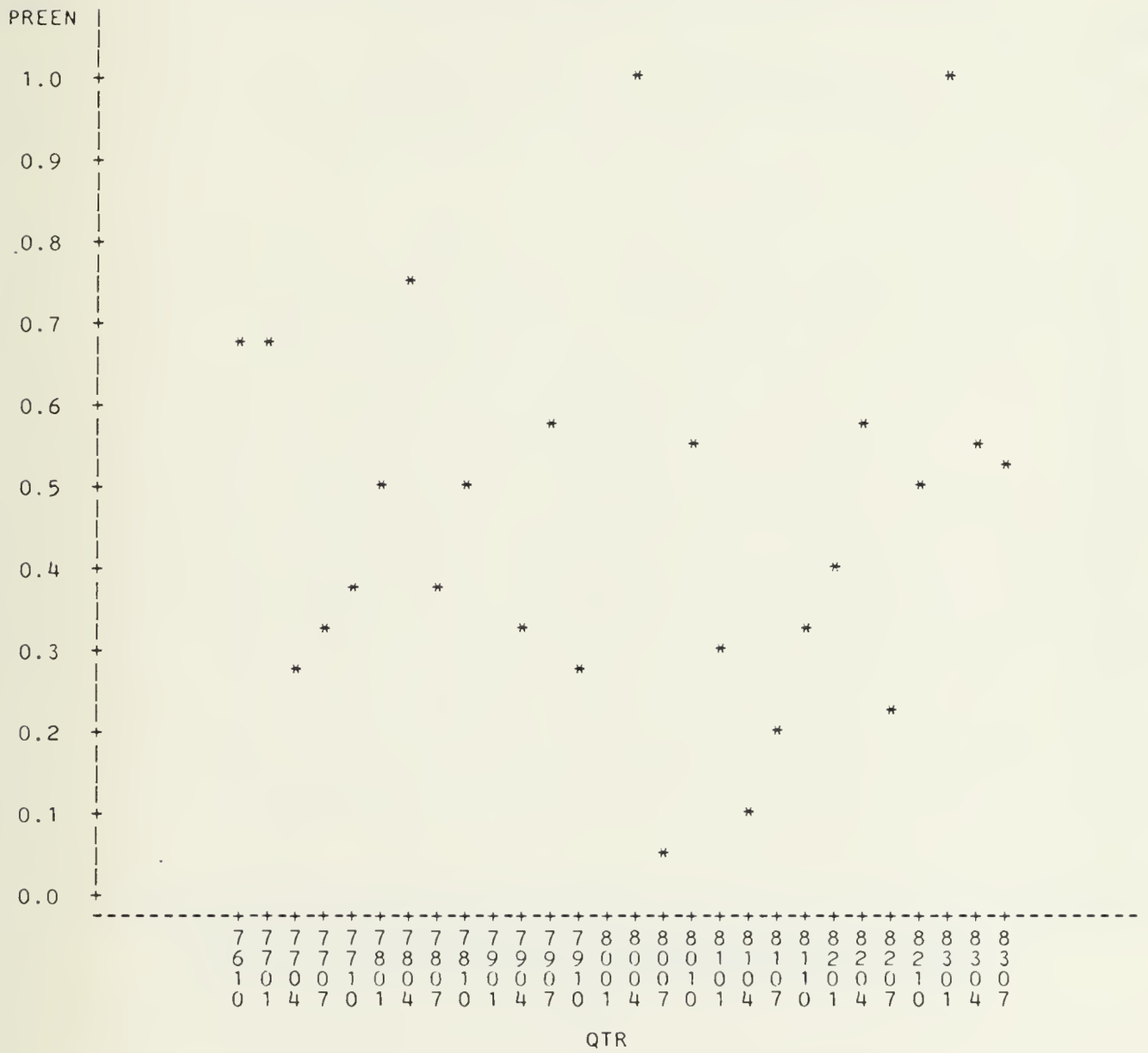

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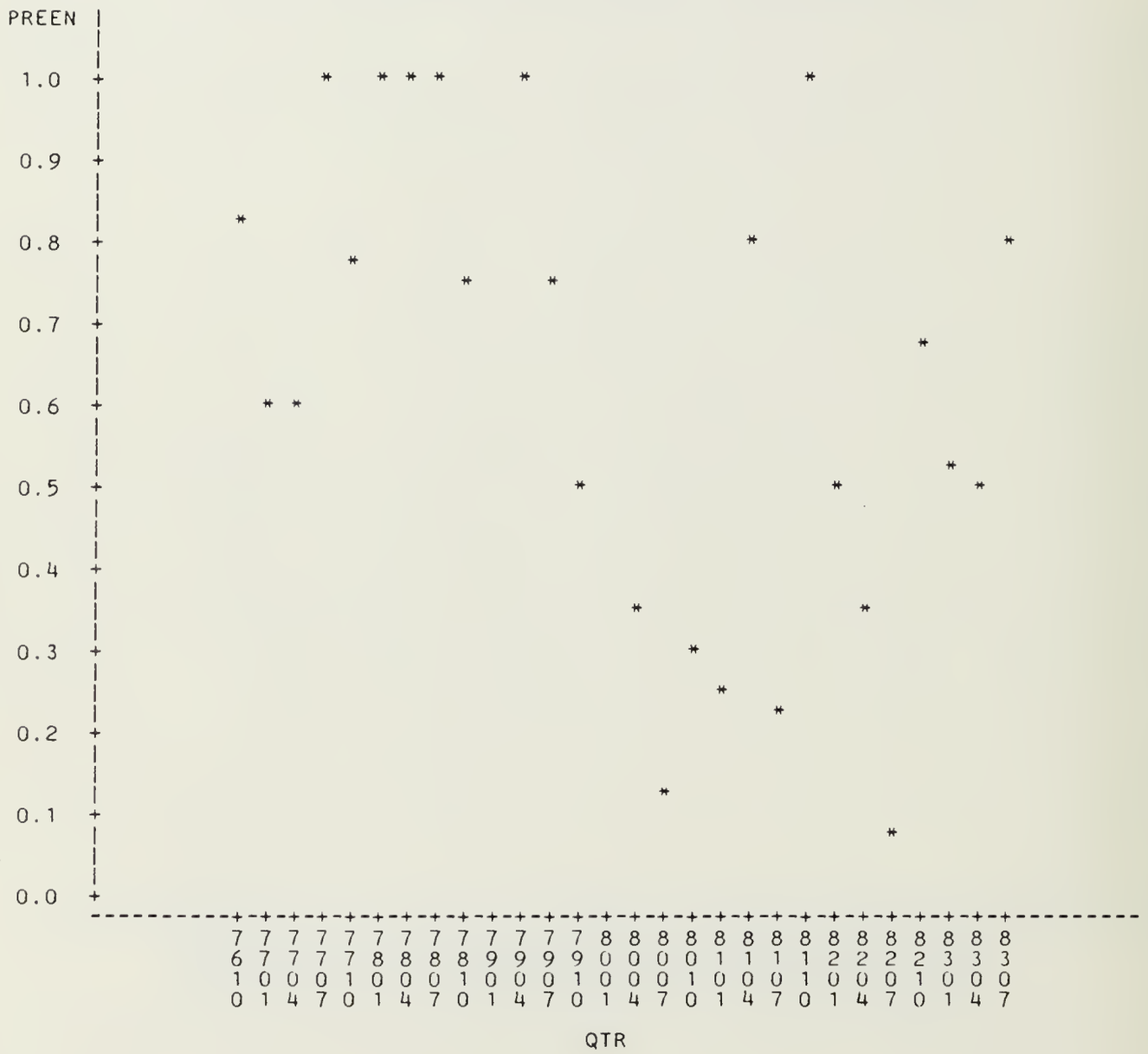

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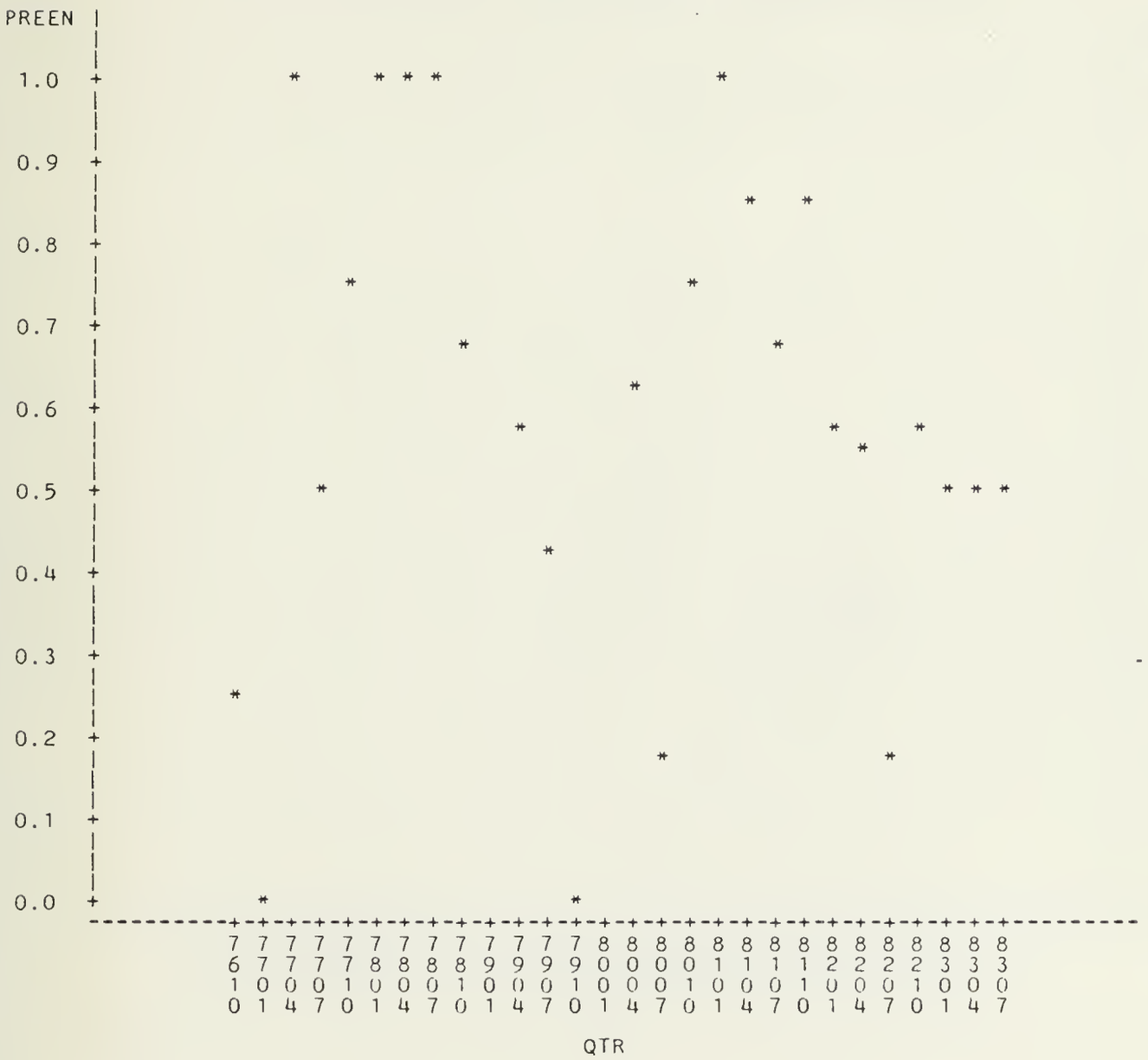

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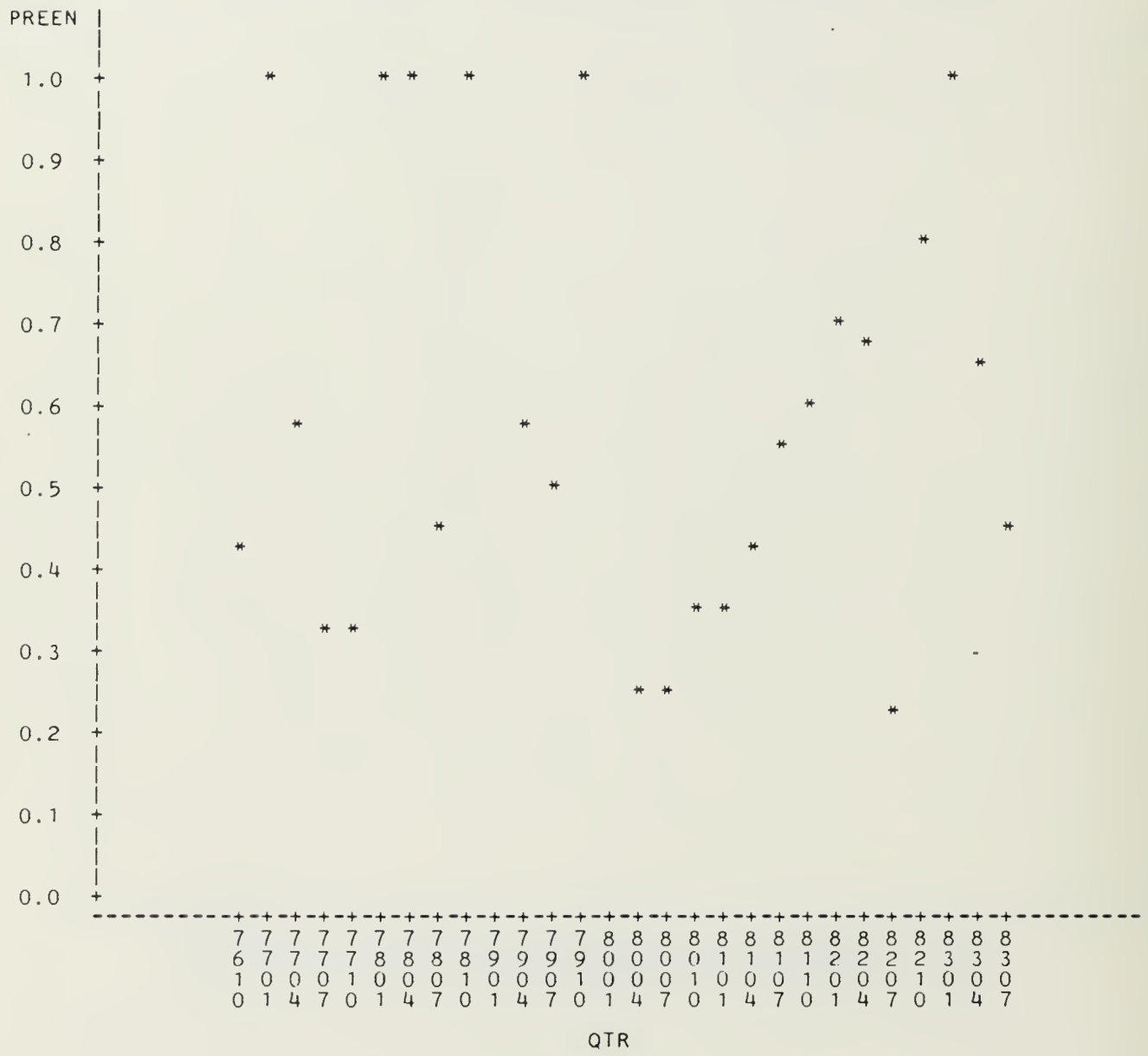

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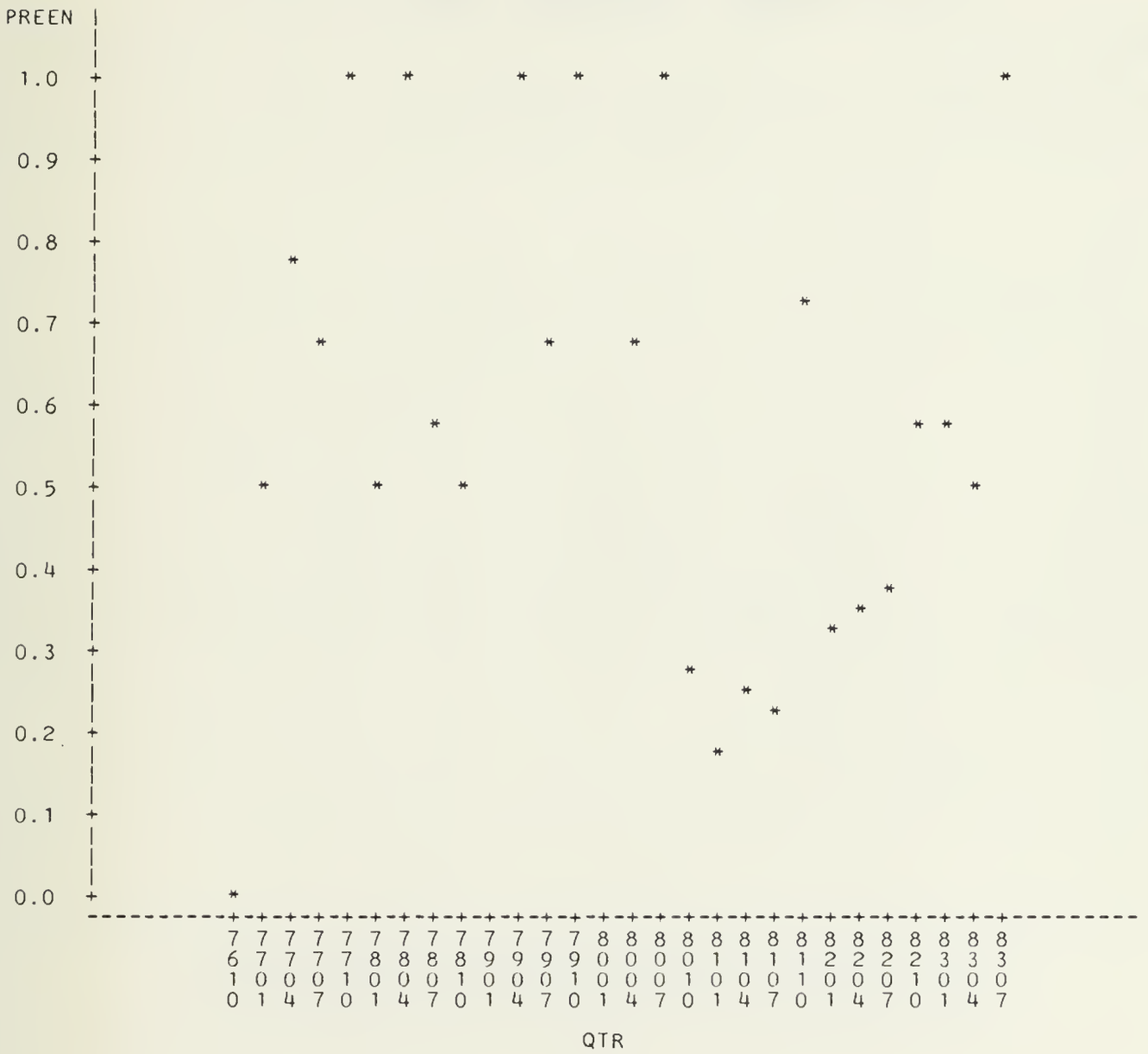

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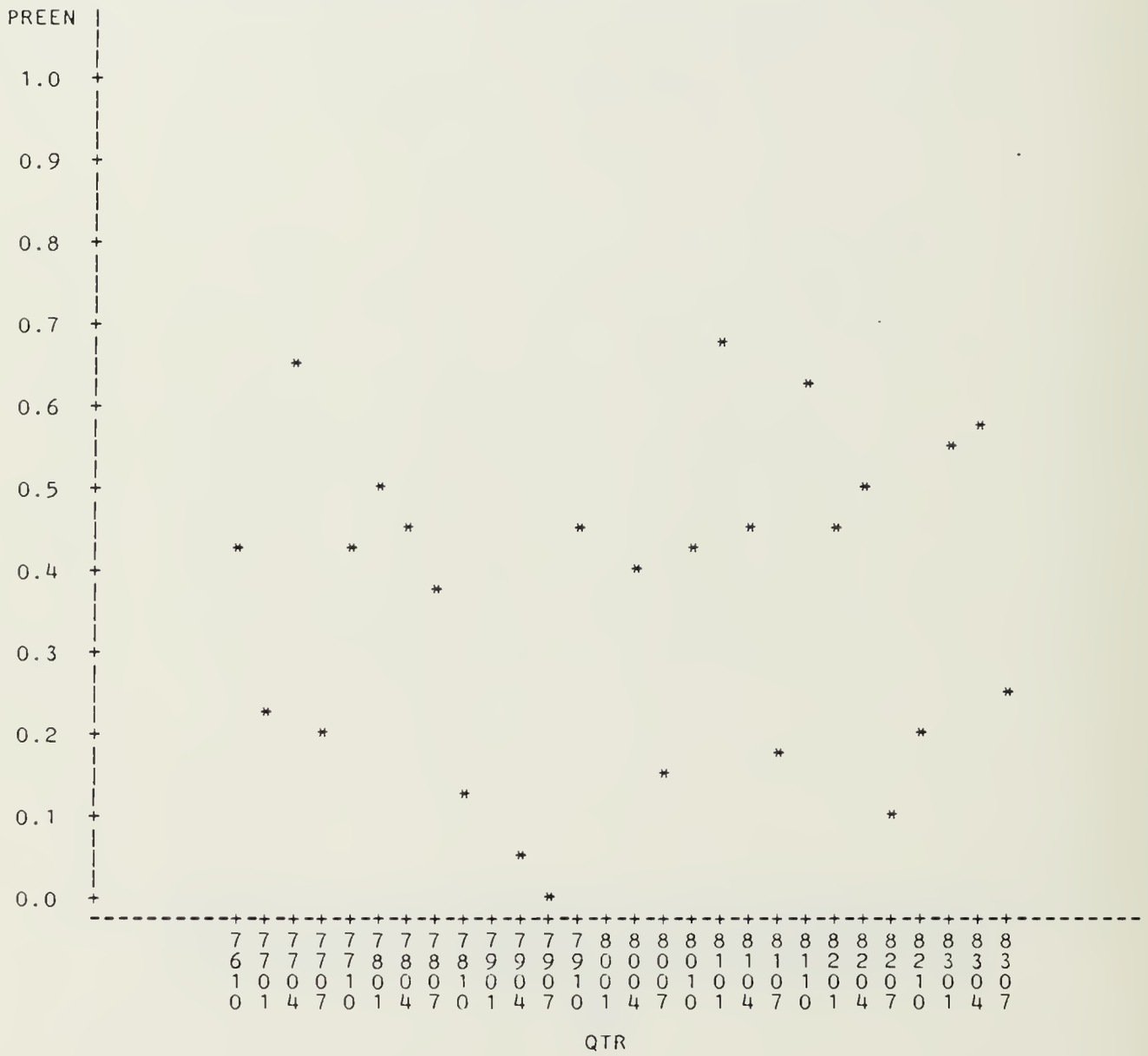
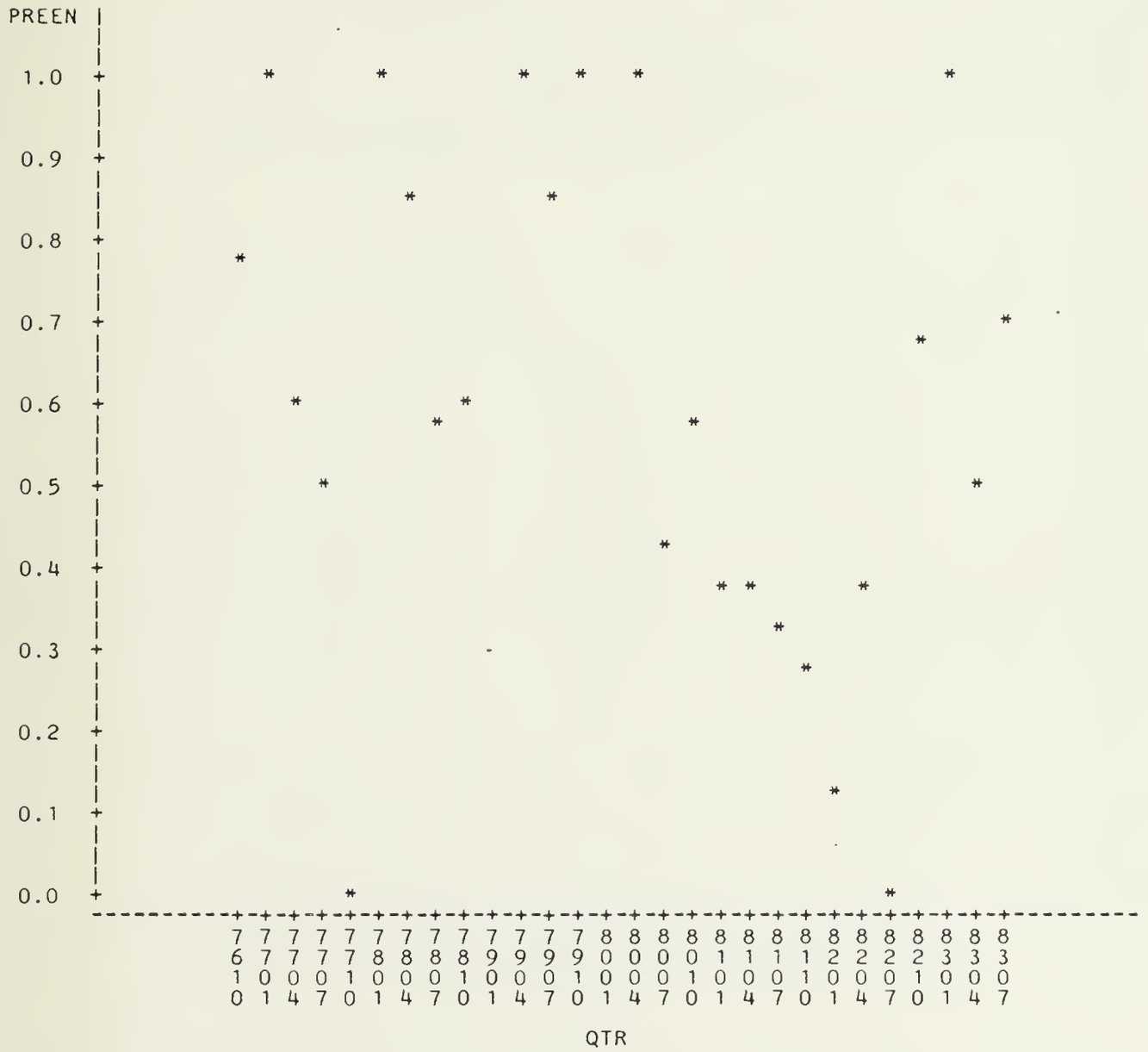
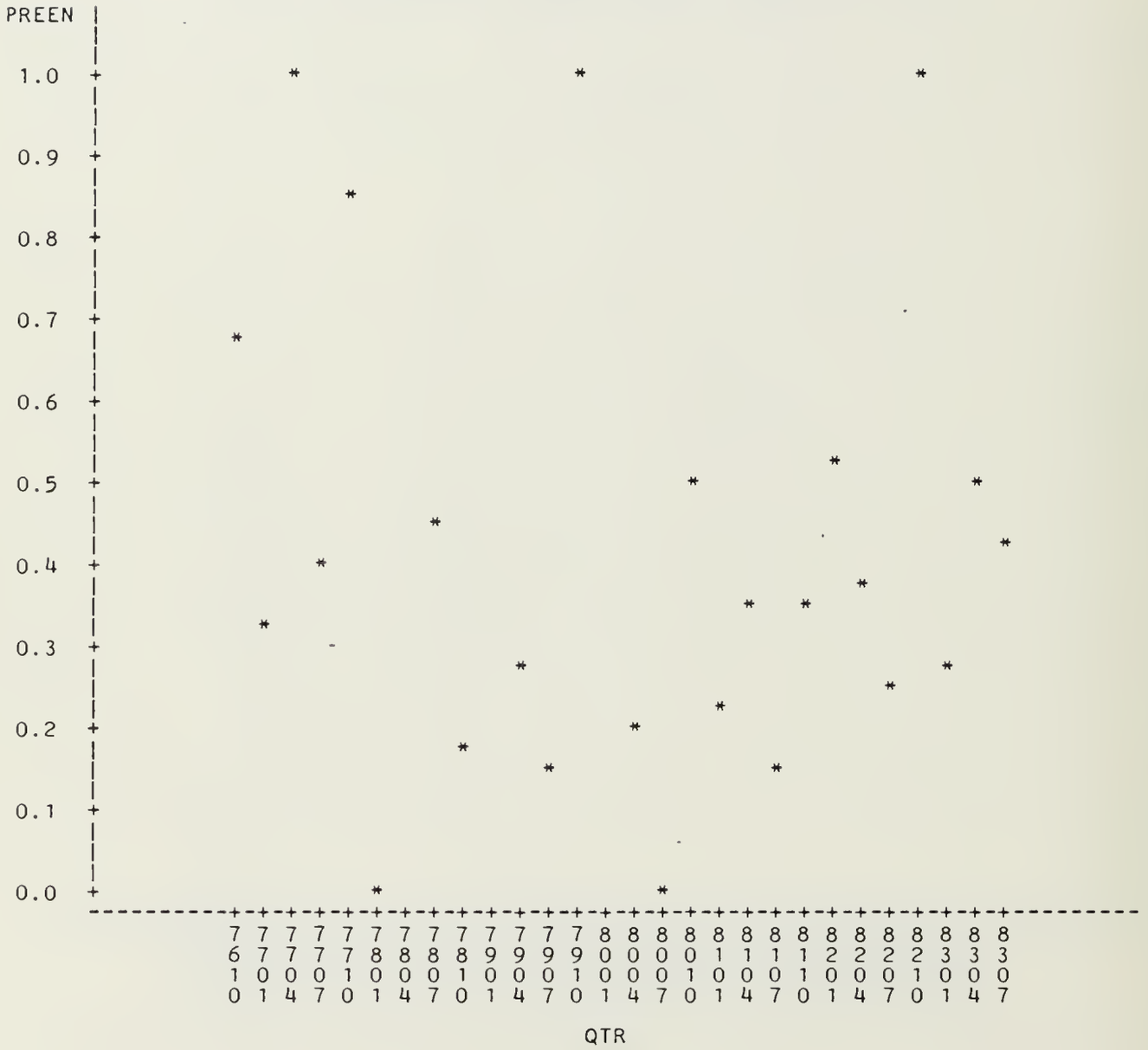


PLOT OF PREEN*QTR SYMBOL USED IS *

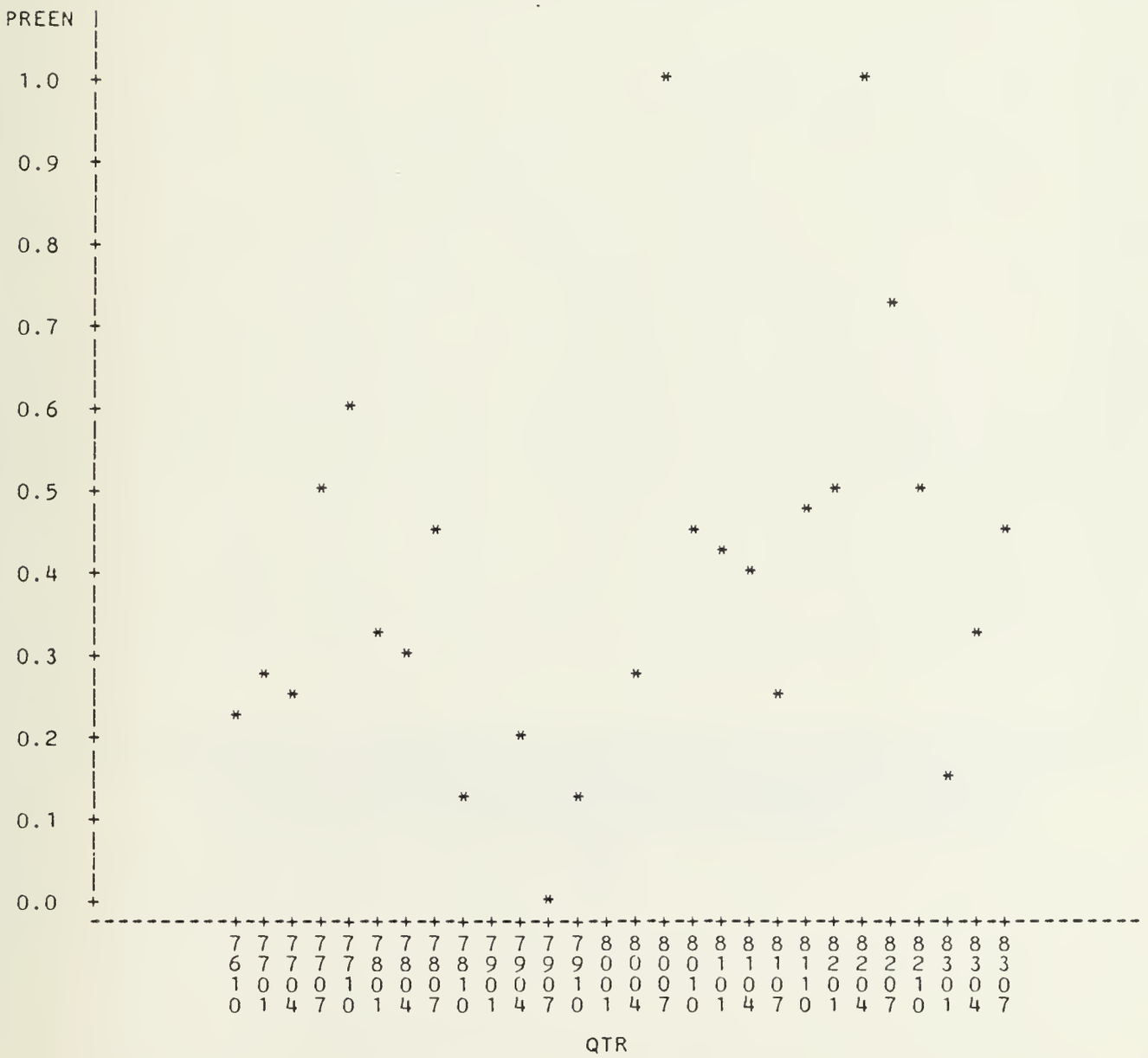


PLOT OF PREEN*QTR SYMBOL USED IS *

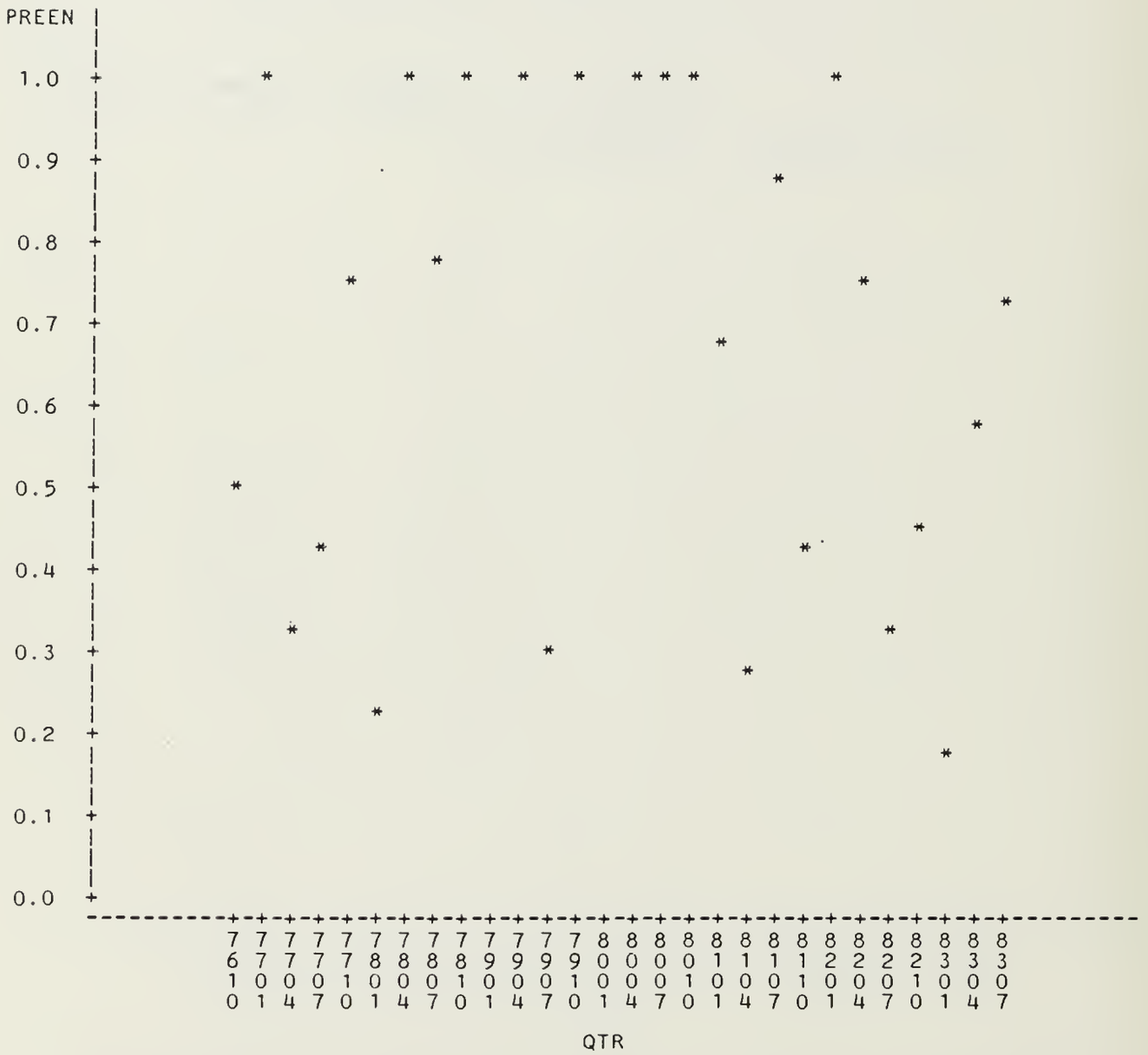


UIC=N54061

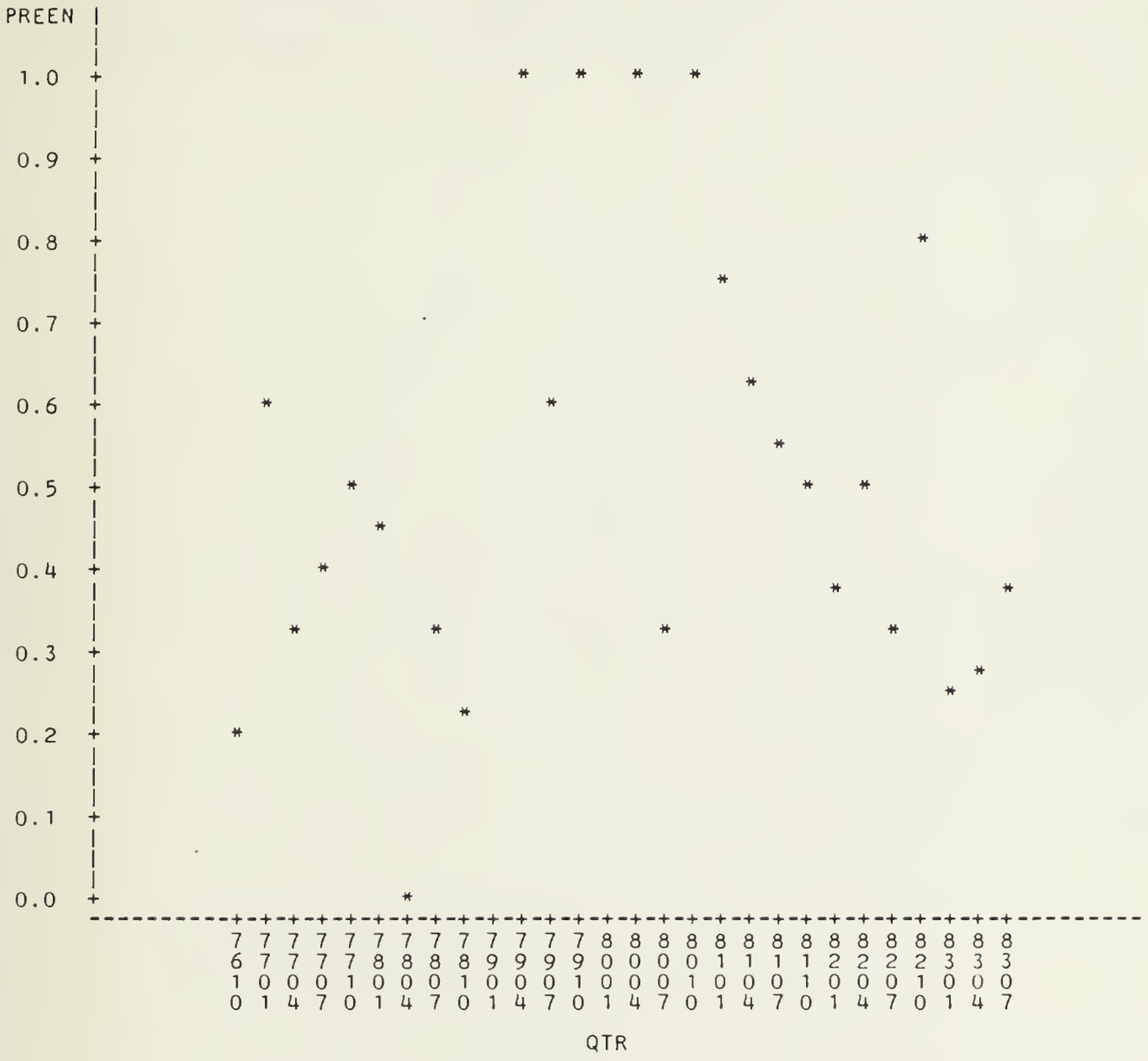
PLOT OF PREEN*QTR SYMBOL USED IS *



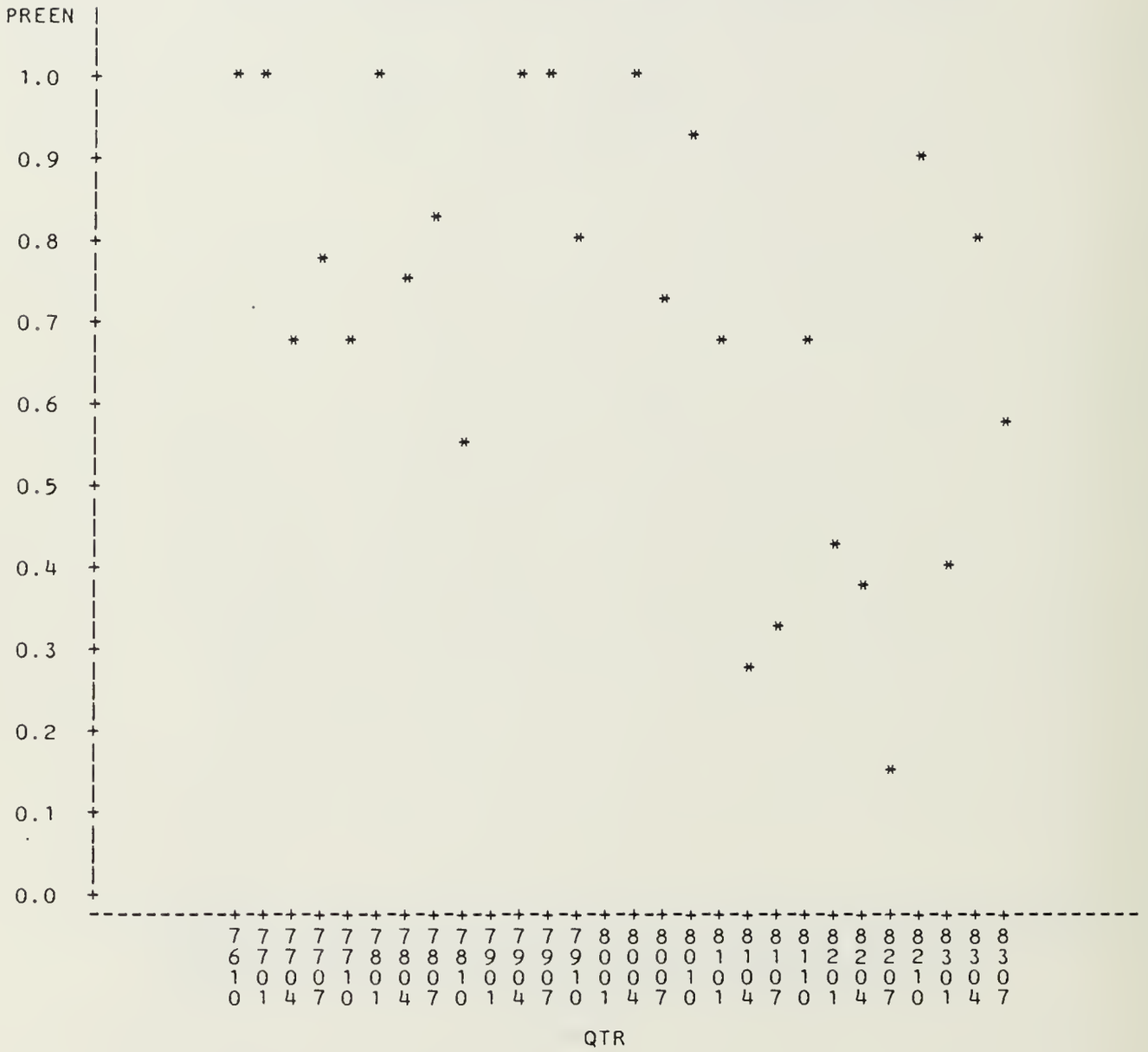
PLOT OF PREEN*QTR SYMBOL USED IS *



PLOT OF PREEN*QTR SYMBOL USED IS *



PLOT OF PREEN*QTR SYMBOL USED IS *



APPENDIX D
SAS PROGRAMS

The enclosed SAS programs were utilized to perform the data set construction and delta analysis which provided the plots contained in Appendices B and C.

```
***Program to input personnel data***

//USNREC JOB (1850,5555),'HEWETT',CLASS=B
//*MAIN  ORG=NPGVM1.1850P
//  EXEC SAS
//FILEIN  DD DISP=SHR,DSN=MSS.S1850.F7184
//FILEOUT DD DISP=(OLD,KEEP),DSN=MSS.S1850.USNREC
//SYSIN DD *
DATA FILEOUT.USNREC;
     INFILE FILEIN;
     INPUT
  @1 ACDU   PIB2.
  @3 PRIOCC PIB2.
  @5 ED PIB1.
  @6 AFQTPER PIB1.
  @7 PAYGRADE PIB1.
  @8 DOBYR PIB1.
  @9 DOBMO PIB1.
 @10 DOBDY PIB1.
 @11 RACE PIB1.
 @12 MARSTAT PIB1.
 @13 DEP PIB1.
 @14 AFQTCAT PIB1.
 @15 RATE $CHAR3.
 @18 NEC $CHAR4.
 @22 SEPCODE $CHAR3.
 @25 DOSYR PIB1.
 @26 DOSMO PIB1.
 @27 DOSDY PIB1.
 @28 BASDYR PIB1.
 @29 BASDMO PIB1.
 @30 BASDDY PIB1.
 @31 CURRGDYR PIB1.
 @32 CURRGDMO PIB1.
 @33 ENLYR PIB1.
```

```
 @34 ENLMO PIB1.
 @35 VRBMUL PIB1.
 @36 REB1 $CHAR2.
 @36 REB PIB1.
 @38 PEBDYR PIB1.
 @39 PEBDMO PIB1.
 @40 PEBDDY PIB1.
 @41 UIC $CHAR6.
 ;
DATE = DOSYR*100 + DOSMO;
SRBDATE=DOSYR*10000+DOSMO*100+DOSDY;
    AGE = ((DOSYR-DOBYR) * 12) + (DOSMO-DOBMO);
    QUAL = PAYGRADE/(((DOSYR-BASDYR) * 12) +
                                    + (DOSMO-BASDMO));
    PROMO = ((DOSYR-CURRGDYR)*12)+(DOSMO-CURRGDMO);
    IF( UIC EQ 'N54045')OR(UIC EQ 'N54046')
    OR(UIC EQ 'N54048')OR(UIC EQ 'N54050')
    OR(UIC EQ 'N54053')OR(UIC EQ 'N54058')
    OR(UIC EQ 'N54060')OR(UIC EQ 'N54061')
    OR(UIC EQ 'N54064')OR(UIC EQ 'N54065')
    OR(UIC EQ 'N54071')OR(UIC EQ 'N20054')
    OR(UIC EQ 'N54038')OR(UIC EQ 'N54049')
    OR(UIC EQ 'N54055')OR(UIC EQ 'N20066')
    OR(UIC EQ 'N54035') THEN SHIP = 1;
    ELSE SHIP = 0;
IF DATE LT 7810 THEN FLAG1= 1; ELSE FLAG1= 0;
IF(FLAG1 EQ 1 AND REB EQ 1)
OR (FLAG1 EQ 1 AND REB EQ 101)
OR (FLAG1 EQ 0 AND REB1 EQ '1 ')
OR (FLAG1 EQ 0 AND REB1 EQ '1R')
THEN REC = 1;
ELSE REC = 2;
DROP FLAG1;
    IF SEPCODE EQ 'KHC' OR  SEPCODE EQ '000'
    THEN REEN = 1;
```

```
ELSE REEN=0;
IF DATE GT 7609 AND DATE LT 7701 THEN QTR = 7610;
IF DATE GT 7612 AND DATE LT 7704 THEN QTR = 7701;
IF DATE GT 7703 AND DATE LT 7707 THEN QTR = 7704;
IF DATE GT 7706 AND DATE LT 7710 THEN QTR = 7707;
IF DATE GT 7709 AND DATE LT 7801 THEN QTR = 7710;
IF DATE GT 7712 AND DATE LT 7804 THEN QTR = 7801;
IF DATE GT 7803 AND DATE LT 7807 THEN QTR = 7804;
IF DATE GT 7806 AND DATE LT 7810 THEN QTR = 7807;
IF DATE GT 7809 AND DATE LT 7901 THEN QTR = 7810;
IF DATE GT 7912 AND DATE LT 7904 THEN QTR = 7901;
IF DATE GT 7903 AND DATE LT 7907 THEN QTR = 7904;
IF DATE GT 7906 AND DATE LT 7910 THEN QTR = 7907;
IF DATE GT 7909 AND DATE LT 8001 THEN QTR = 7910;
IF DATE GT 8012 AND DATE LT 8004 THEN QTR = 8001;
IF DATE GT 8003 AND DATE LT 8007 THEN QTR = 8004;
IF DATE GT 8006 AND DATE LT 8010 THEN QTR = 8007;
IF DATE GT 8009 AND DATE LT 8101 THEN QTR = 8010;
IF DATE GT 8012 AND DATE LT 8104 THEN QTR = 8101;
IF DATE GT 8103 AND DATE LT 8107 THEN QTR = 8104;
IF DATE GT 8106 AND DATE LT 8110 THEN QTR = 8107;
IF DATE GT 8109 AND DATE LT 8201 THEN QTR = 8110;
IF DATE GT 8112 AND DATE LT 8204 THEN QTR = 8201;
IF DATE GT 8203 AND DATE LT 8207 THEN QTR = 8204;
IF DATE GT 8206 AND DATE LT 8210 THEN QTR = 8207;
IF DATE GT 8209 AND DATE LT 8301 THEN QTR = 8210;
IF DATE GT 8212 AND DATE LT 8304 THEN QTR = 8301;
IF DATE GT 8303 AND DATE LT 8307 THEN QTR = 8304;
IF DATE GT 8306 AND DATE LT 8310 THEN QTR = 8307;
IF QTR LT 8310 AND QTR GT 8207 THEN FY= 83;
IF QTR LT 8210 AND QTR GT 8107 THEN FY= 82;
IF QTR LT 8110 AND QTR GT 8007 THEN FY= 81;
IF QTR LT 8010 AND QTR GT 7907 THEN FY= 80;
IF QTR LT 7910 AND QTR GT 7807 THEN FY= 79;
IF QTR LT 7810 AND QTR GT 7707 THEN FY= 78;
```

```
    IF QTR LT 7710 AND QTR GT 7607 THEN FY= 77;
    IF ACDU LE 72 THEN TERM=1;
    IF ACDU GT 72 AND ACDU LE 120 THEN TERM=2;
    IF ACDU GT 120 AND ACDU LE 168 THEN TERM=3;
    IF ACDU GT 168 THEN TERM=4;
/*
//
```

```
***Program to input ship data***

//USNREC JOB (1850,5555),'HEWETT',CLASS=B
//*MAIN  ORG=NPGVM1.1850P
//  EXEC SAS
//FILEIN  DD DISP=SHR,DSN=MSS.S1850.F7184
//MYFILE DD DISP=(OLD,KEEP),DSN=MSS.S1850.USNREC
//SYSIN DD *
OPTIONS LINESIZE=80;
DATA SHIP;
 INPUT UIC $ CO COUNT QTR STMHRS DEPLOY OVHL OVHLOHP OPPE;
 CARDS;
N54035 3703 0101 7510 318 0 0 0 0
N54035 3703 0102 7601 52 0 0 0 0
N54035 3703 0103 7604 0 0 1 0 0
N54035 3703 0104 7607 0 0 3 0 0
N54035 3703 0105 7610 0 0 3 0 0
N54035 3704 0106 7701 92 0 1 0 0
N54035 3704 0107 7704 776 0 0 0 0
N54035 3704 0108 7707 722 0 0 0 0
N54035 3704 0109 7710 618 0 0 0 0
N54035 3704 0110 7801 396 0 0 0 0
N54035 3704 0111 7804 1718 3 0 0 0
N54035 3704 0112 7807 772 3 0 0 0
N54035 3704 0113 7810 708 1 0 0 0
N54035 3705 0114 7901 187 0 0 0 0
N54035 3705 0115 7904 431 0 0 0 0
N54035 3705 0116 7907 1403 0 0 0 0
N54035 3705 0117 7910 868 2 0 0 0
N54035 3705 0118 8001 981 3 0 0 0
N54035 3705 0119 8004 593 2 0 0 0
N54035 3705 0120 8007 0 0 1 0 0
N54035 3705 0121 8010 0 0 3 0 0
N54035 3706 0122 8101 0 0 3 0 0
N54035 3706 0123 8104 0 0 3 0 0
```

```
N54035 3706 0124 8107 59 0 3 0 0
N54035 3706 0125 8110 381 0 0 0 0
N54035 3706 0126 8201 382 0 0 0 0
N54035 3706 0127 8204 912 1 0 0 0
N54035 3706 0128 8207 754 3 0 0 0
N54035 3706 0129 8210 1032 2 0 0 0
N54035 3706 0130 8301 93 0 0 0 0
N54035 3707 0131 8304 341 0 0 0 0
N54035 3707 0132 8307 784 0 0 0 0

(Remainder of ships deleted.)

DATA MYFILE.USNREC2;
SET SHIP;
;
/*
//
```

```
***Program to compute reenlistment rates  of FF's***

//USNREC JOB (1850,5555),'HEWETT',CLASS=C
//*MAIN  ORG=NPGVM1.1850P,LINES=(10)
//  EXEC SAS
//FILEIN  DD DISP=SHR,DSN=MSS.S1850.F7184
//MYFILE DD DISP=SHR,DSN=MSS.S1850.USNREC
//SYSIN DD *
OPTIONS LINESIZE=80 PAGESIZE=66;
DATA TEMP2;
     SET MYFILE.USNREC;
    IF SHIP EQ 1 AND (DATE GT 7609) AND (DATE LT 8310)
    AND REC EQ 1;
PROC SORT DATA = TEMP2; BY UIC QTR;
PROC SUMMARY;
    CLASS  QTR;
    VAR REEN;
    OUTPUT       OUT = USNSUB2
         N(REEN) = NCASE
         SUM(REEN) = NREEN;
DATA USNSUB2;
    SET USNSUB2;
    IF QTR EQ . THEN DELETE;
    PREEN = NREEN/NCASE;
PROC PLOT UNIFORM;
    PLOT PREEN*QTR='*'/HAXIS=7610
    7701 7704 7707 7710 7801 7804
    7807 7810 7901 7904 7907 7910
    8001 8004 8007 8010 8101 8104
    8107 8110 8201 8204 8207 8210
    8301 8304 8307;
/*
//
```

```
***Program to compute deltas***

//USNREC JOB (1850,5555),'HEWETT',CLASS=C
//*MAIN  ORG=NPGVM1.1850P,LINES=(10)
//  EXEC SAS
//FILEIN  DD DISP=SHR,DSN=MSS.S1850.F7184
//MYFILE DD DISP=SHR,DSN=MSS.S1850.USNREC
//SYSIN DD *
OPTIONS LINESIZE=80 PAGESIZE=66;
DATA TEMP1;
    SET MYFILE.USNREC2;
    TOTHRS = LAG1(STMHRS) + LAG2(STMHRS)
             + LAG3(STMHRS) + LAG4(STMHRS);
    AWAY=LAG1(DEPLOY)+LAG2(DEPLOY);
    YARD=LAG1(OVHL)+LAG2(OVHL);
    CRISIS=LAG1(OPPE)+LAG2(OPPE);
DATA TEMPSHIP;
    SET TEMP1;
    IF QTR GT 7607;
DATA TEMP2;
    SET MYFILE.USNREC;
    IF SHIP EQ 1 AND (DATE GT 7609)
    AND (DATE LT 8310) AND REC EQ 1;
    IF RACE EQ 1 THEN WHITE=1; ELSE WHITE=0;
PROC SORT DATA = TEMPSHIP; BY UIC QTR;
PROC SORT DATA = TEMP2; BY UIC QTR;
DATA FINAL;
    MERGE TEMP2 TEMPSHIP;
    BY UIC QTR;
    IF QTR GT 7607 AND QTR LT 8310;
    SEPARATE=MARSTAT*AWAY;
    STMSEP=MARSTAT*TOTHRS;
DATA FY77;
    SET FINAL;
    IF FY EQ 77;
```

```
PROC LOGIST PRINTC OUTPUT OUT=BETA77
    OUTPUTP OUTP=PRED77;
MODEL REEN=ACDU WHITE DEP/PRINTI PRINTQ;
PROC SORT DATA=PRED77;
    BY UIC QTR;
DATA FY78;
    SET FINAL;
    IF FY EQ 78;
PROC LOGIST PRINTC OUTPUT OUT=BETA78
    OUTPUTP OUTP=PRED78;
MODEL REEN= AGE DEP CRISIS YARD WHITE/PRINTI PRINTQ;
PROC SORT DATA=PRED78;
    BY UIC QTR;
DATA FY79;
    SET FINAL;
    IF FY EQ 79;
PROC LOGIST PRINTC OUTPUT OUT=BETA79
    OUTPUTP OUTP=PRED79;
MODEL REEN=ACDU WHITE QUAL STMSEP AFQTPER/
    PRINTI PRINTQ;
PROC SORT DATA=PRED79;
    BY UIC QTR;
DATA FY80;
    SET FINAL;
    IF FY EQ 80;
PROC LOGIST PRINTC OUTPUT OUT=BETA80
    OUTPUTP OUTP=PRED80;
MODEL REEN=ACDU AGE STMSEP CRISIS QUAL AFQTPER/
    PRINTI PRINTQ;
PROC SORT DATA=PRED80;
    BY UIC QTR;
DATA FY81;
    SET FINAL;
    IF FY EQ 81;
PROC LOGIST PRINTC OUTPUT OUT=BETA81
```

```
    OUTPUTP OUTP=PRED81;
MODEL REEN=ACDU STMSEP QUAL PROMO/PRINTI PRINTQ;
PROC SORT DATA=PRED81;
    BY UIC QTR;
DATA FY82;
    SET FINAL;
    IF FY EQ 82;
    PROC LOGIST PRINTC OUTPUT OUT=BETA82
OUTPUTP OUTP=PRED82;
MODEL REEN=AGE DEP WHITE PAYGRADE/PRINTI PRINTQ;
PROC SORT DATA=PRED82;
    BY UIC QTR;
DATA FY83;
    SET FINAL;
    IF FY EQ 83;
PROC LOGIST PRINTC OUTPUT OUT=BETA83
    OUTPUTP OUTP=PRED83;
MODEL REEN=PAYGRADE DEP AGE AFQTPER AWAY/
    PRINTI PRINTQ;
PROC SORT DATA=PRED83;
    BY UIC QTR;
DATA BETAS;
    MERGE BETA77 BETA78 BETA79
    BETA80 BETA81 BETA82 BETA83;
DATA PRED;
    MERGE PRED77 PRED78 PRED79
    PRED80 PRED81 PRED82 PRED83;
    BY UIC QTR;
PROC PRINT DATA=BETAS;
    TITLE CONTENTS OF OUTPUT DATA SET;
PROC SORT DATA=PRED;
    BY UIC QTR;
DATA FINAL2;
    SET PRED;
    DELTA=REEN-_P_;
```

```
PROC MEANS DATA=FINAL2 NOPRINT;
    VAR DELTA;
    BY UIC QTR;
    OUTPUT OUT=SKIPPER MEAN =DELTA N = N;
PROC PLOT UNIFORM;
    BY UIC;
    PLOT DELTA*QTR=N/HAXIS=7610 7701 7704
7707 7710 7801 7804 7807
7810 7901 7904 7907 7910 8001
8004 8007 8010 8101 8104 8107 8110
8201 8204 8207 8210 8301 8304 8307 VREF=0.0;
/*
//
```

```
***Program to compare
          reenlistment percentages with deltas***

//USNREC JOB (1850,5555),'HEWETT',CLASS=C
//*MAIN  ORG=NPGVM1.1850P,LINES=(10)
//  EXEC SAS
//FILEIN  DD DISP=SHR,DSN=MSS.S1850.F7184
//MYFILE DD DISP=SHR,DSN=MSS.S1850.USNREC
//SYSIN DD *
OPTIONS LINESIZE=80;
DATA TEMP2;
     SET MYFILE.USNREC;
    IF SHIP EQ 1 AND (DATE GT 7609)
    AND (DATE LT 8310);
PROC SORT DATA = TEMP2; BY UIC QTR;
PROC SUMMARY;
    CLASS  UIC QTR;
    VAR REEN;
    OUTPUT        OUT = USNSUB2
          N(REEN) = NCASE
          SUM(REEN) = NREEN;
DATA USNSUB2;
    SET USNSUB2;
    IF UIC EQ ' ' THEN DELETE;
    IF QTR EQ . THEN DELETE;
    PREEN = NREEN/NCASE;
PROC SUMMARY DATA=TEMP2;
    CLASS  QTR;
    VAR REEN;
    OUTPUT        OUT = USNSUB3
          N(REEN) = NCASE
          SUM(REEN) = NREEN;
DATA USNSUB3;
    SET USNSUB3;
    IF QTR EQ . THEN DELETE;
```

```
    FFAVE = NREEN/NCASE;
    DIFF=FFAVE*(-1);
PROC SORT DATA=USNSUB2; BY QTR;
PROC SORT DATA=USNSUB3; BY QTR;
DATA DELTAS;
    MERGE USNSUB2 USNSUB3;
    BY QTR;
    IF QTR GT 7607 AND QTR LT 8310;
    DELTPCT=PREEN+DIFF;
DATA TEMP1;
    SET MYFILE.USNREC2;
    TOTHRS = LAG1(STMHRS) + LAG2(STMHRS)
           + LAG3(STMHRS) + LAG4(STMHRS);
    AWAY=LAG1(DEPLOY)+LAG2(DEPLOY);
    YARD=LAG1(OVHL)+LAG2(OVHL);
    CRISIS=LAG1(OPPE)+LAG2(OPPE);
DATA TEMPSHIP;
    SET TEMP1;
    IF QTR GT 7607;
DATA TEMP2;
     SET MYFILE.USNREC;
    IF SHIP EQ 1 AND (DATE GT 7609)
    AND (DATE LT 8310) AND REC EQ 1;
    IF RACE EQ 1 THEN WHITE=1; ELSE WHITE=0;
PROC SORT DATA = TEMPSHIP; BY UIC QTR;
PROC SORT DATA = TEMP2; BY UIC QTR;
DATA FINAL;
    MERGE TEMP2 TEMPSHIP;
    BY UIC QTR;
    IF QTR GT 7607 AND QTR LT 8310;
    SEPARATE=MARSTAT*AWAY;
    STMSEP=MARSTAT*TOTHRS;
DATA FY77;
    SET FINAL;
    IF FY EQ 77;
```

```
PROC LOGIST PRINTC OUTPUT OUT=BETA77
    OUTPUTP OUTP=PRED77;
MODEL REEN=ACDU WHITE DEP/PRINTI PRINTQ;
PROC SORT DATA=PRED77;
    BY UIC QTR;
DATA FY78;
    SET FINAL;
    IF FY EQ 78;
PROC LOGIST PRINTC OUTPUT OUT=BETA78
    OUTPUTP OUTP=PRED78;
MODEL REEN=AGE DEP CRISIS YARD WHITE/PRINTI PRINTQ;
PROC SORT DATA=PRED78;
    BY UIC QTR;
DATA FY79;
    SET FINAL;
    IF FY EQ 79;
PROC LOGIST PRINTC OUTPUT OUT=BETA79
    OUTPUTP OUTP=PRED79;
MODEL REEN=ACDU WHITE QUAL STMSEP AFQTPER/
    PRINTI PRINTQ;
PROC SORT DATA=PRED79;
    BY UIC QTR;
DATA FY80;
    SET FINAL;
    IF FY EQ 80;
PROC LOGIST PRINTC OUTPUT OUT=BETA80
    OUTPUTP OUTP=PRED80;
MODEL REEN=ACDU AGE STMSEP CRISIS QUAL AFQTPER/
    PRINTI PRINTQ;
PROC SORT DATA=PRED80;
    BY UIC QTR;
DATA FY81;
    SET FINAL;
    IF FY EQ 81;
PROC LOGIST PRINTC OUTPUT OUT=BETA81
```

```
    OUTPUTP OUTP=PRED81;
MODEL REEN=ACDU STMSEP QUAL PROMO/PRINTI PRINTQ;
PROC SORT DATA=PRED81;
    BY UIC QTR;
DATA FY82;
    SET FINAL;
    IF FY EQ 82;
PROC LOGIST PRINTC OUTPUT OUT=BETA82
    OUTPUTP OUTP=PRED82;
MODEL REEN=AGE DEP WHITE PAYGRADE ED/PRINTI PRINTQ;
PROC SORT DATA=PRED82;
    BY UIC QTR;
DATA FY83;
    SET FINAL;
    IF FY EQ 83;
PROC LOGIST PRINTC OUTPUT OUT=BETA83
    OUTPUTP OUTP=PRED83;
MODEL REEN=PAYGRADE DEP AGE AWAY AFQTPER/
    PRINTI PRINTQ;
PROC SORT DATA=PRED83;
    BY UIC QTR;
PROC SORT DATA=PRED81;
    BY UIC QTR;
DATA BETAS;
    MERGE BETA77 BETA78 BETA79
    BETA80 BETA81 BETA82 BETA83;
DATA PRED;
    MERGE PRED77 PRED78 PRED79
    PRED80 PRED81 PRED82 PRED83;
    BY UIC QTR;
PROC PRINT DATA=BETAS;
    TITLE CONTENTS OF OUTPUT DATA SET;
PROC SORT DATA=PRED;
    BY UIC QTR;
DATA FINAL2;
```

```
    SET PRED;
    DELTA=REEN-_P_;
PROC MEANS DATA=FINAL2 NOPRINT;
    VAR DELTA;
    BY UIC QTR;
    OUTPUT OUT=SKIPPER MEAN =DELTA N = N;
PROC SORT DATA=SKIPPER;
    BY UIC QTR;
PROC SORT DATA=DELTAS;
    BY UIC QTR;
DATA FINAL;
    MERGE SKIPPER DELTAS;
    BY UIC QTR;
IF DELTPCT GE 0 AND DELTA GE 0 THEN SWITCH=0;
ELSE IF DELTPCT LT 0 AND DELTA LT 0 THEN SWITCH=0;
ELSE SWITCH=1;
PROC SORT DATA=FINAL;
    BY UIC QTR;
PROC PRINT;
    VAR SWITCH QTR;
    BY UIC;
PROC FREQ;
    TABLES SWITCH;
    BY UIC;
/*
//
```

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